

Stabilization Policies,  
Poverty and the Labor Market  
Analytical Issues and Empirical Evidence

Pierre-Richard Agénor\*  
The World Bank  
Washington DC 20433, USA

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**Abstract**

This paper discusses the various channels through which stabilization policies affect poverty in developing countries. It begins by reviewing some of the recent evidence on poverty rates. The second part provides a taxonomic review of the various channels through which macroeconomic policies affect the poor, with a particular emphasis on the role of the labor market. The third part presents an analytical framework that captures some of the main features of the urban labor market in developing countries, and studies the effects of fiscal adjustment on wages, employment, and poverty. The fourth part presents cross-country regressions linking macroeconomic variables and poverty rates. Although the results should be treated with care given the relatively short sample size, they suggest that inflation has an adverse effect on poverty. The share of subsidies and other transfers in proportion of government expenditure is significantly correlated with poverty only in sub-Saharan Africa. The last part discusses various research perspectives.

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# 1 Introduction

Understanding and assessing the distributional and poverty effects of stabilization programs remains a policy issue of considerable importance for economists. There has been growing recognition, for instance, of the fact that assessing the benefits and costs of disinflation policies entails an intertemporal trade-off. In particular, it is well recognized that the large budgetary cuts that have been associated in some cases with stabilization efforts have fallen disproportionately on social spending, thereby worsening the plight of lower-income groups in the short term. At the same time, however, it has been pointed out that these groups tend also to be the ones most adversely affected by high inflation; to the extent that fiscal austerity leads to a durable reduction in the rate of price increases, the poor may benefit from government spending cuts in the longer run. It is therefore important to carefully evaluate the net benefits (in present value terms) that this tradeoff entails.

Surprisingly enough, however, the evidence examining the links between stabilization policies and the poor remains fairly limited. Various country-specific (or region-specific) studies dealing with economic adjustment and the poor have been published in recent years; but they often remain highly descriptive when it comes to assessing the effect of macroeconomic variables on poverty. In addition, although it is well recognized that the poor often generate a sizable share of their income from wage employment, the role of the labor market in the transmission of macroeconomic policy shocks to lower-income groups (particularly those located in the urban sector) has not been fully explored. Understanding this role is all the more important given the peculiarities and imperfections that often characterize the labor market in developing countries.

The present study attempts to contribute to the current debate at two broad levels: it examines, at the conceptual level, the role of the labor market in the transmission of policy shocks to the poor, and provides some quantitative evidence on the effect of macroeconomic factors on poverty. The remainder of the paper is organized as follows. Section II provides a brief review of the recent evidence on poverty in developing countries, with particular emphasis on Latin America and sub-Saharan Africa. The various channels through which stabilization policies affect poverty are discussed in Section III. Both direct and indirect effects (through, for instance, inflation and aggregate demand) are analyzed. The role of the labor market is also discussed in general terms. Section IV develops an analytical framework that captures in a more formal way the role of the labor market in the

transmission mechanism of macroeconomic policy shocks. The model incorporates several important and well-documented features of the labor market in developing countries: efficiency wages, a large informal sector, labor market segmentation, a heterogeneous and imperfectly mobile labor force, and wage flexibility in the informal economy.<sup>1</sup> Section V examines the impact and steady-state effects of a cut in government spending—a typical measure in stabilization programs. Section VI provides some cross-section econometric evidence on the impact of macroeconomic factors on poverty. Section VII identifies several potentially-fruitful areas for future research. Finally, Section VIII summarizes the main results of the analysis and elaborates on its policy implications.

## 2 Poverty: Some Recent Evidence

Figure 1, which is based on the data compiled by Chen and Ravallion (1997), shows the evolution of poverty in various regions of the developing world during the period 1987-93. The indicator displayed in the left panel is the headcount index (the proportion of individuals or households earning less than a given absolute level of income, or poverty line), which measures the *incidence* of poverty, whereas the one displayed on the right is the poverty gap (the average shortfall of the income of the poor with respect to the poverty line, multiplied by the headcount index), which measures the *depth* of poverty.<sup>2</sup> Both indicators depict a similar picture: the incidence of poverty is the highest in South Asia and sub-Saharan Africa, and, apart from East Asia, little progress has been achieved during the period in reducing poverty rates. In Latin American and the Caribbean, and perhaps more so in sub-Saharan Africa, poverty has in fact increased slightly. In countries like Mexico for instance, following the crisis of 1994-95, the incidence of poverty increased significantly.

The evidence also suggests that the distribution of the poor between rural and urban areas varies considerably across regions. This is particularly clear when comparing Latin America and sub-Saharan Africa. In a

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<sup>1</sup>Efficiency wage considerations have been much discussed in the recent literature on labor markets in developing countries. Rationales include better nutrition, incentive and morale factors, adverse selection, turnover costs, and shirking costs. As discussed below, such considerations are particularly important for large, capital-intensive firms, which typically operate in the formal economy.

<sup>2</sup>A uniform poverty line across countries is used in both cases. These two poverty measures are part of the Foster-Greer-Thorbecke class of poverty measures. For further discussion, see Ravallion (1994).

country like Chile, for instance, poverty is evenly distributed between rural and urban areas (Anríquez, Cowan, and De Gregorio, 1998). By contrast, in sub-Saharan Africa, the poor are concentrated in rural areas. According to the data compiled by Sahn, Dorosh, and Younger (1997, Chapter 2), for instance, the share of the national poverty rate accounted for by rural areas in the late 1980s and early 1990s was 78 percent in Côte d'Ivoire, 66 percent in Gambia, 72 percent in Ghana, 90 percent in Kenya and Tanzania, 88 percent in Madagascar, 98 percent in Malawi, and 71 percent in Zambia.<sup>3</sup> According to World Bank estimates, three-fourths of the poor in Côte d'Ivoire in 1995 were estimated to have been in rural areas (World Bank, 1997, p. 11).

The sources of income of the rural poor and the urban poor also differ significantly. The rural poor in many countries in sub-Saharan Africa, for instance, are predominantly self-employed and continue to rely on direct earnings from agricultural production as their main source of income—although income from salaried employment and self-employment in small enterprises have become important in some countries.<sup>4</sup> The data compiled by Sahn et al. (1997), for instance, indicate that in countries like Côte d'Ivoire, Ghana, Guinea, Madagascar, and Tanzania, more than 90 percent of the rural workers were self-employed in the early 1990s, reflecting the dominance of own-account agriculture and, to a lesser extent, small and micro enterprises in manufacturing and services. By contrast, the urban poor are typically self-employed workers in very small enterprises in the informal (nonwage) sector; but their incomes tend to fluctuate closely with changes in activity in the formal economy, because of the ease of entry in the informal sector and the degree of mobility of the labor force between the two sectors.

The distribution of poor households between rural and urban areas has important implications for studies aimed at assessing the effect of short-term stabilization policies on poverty. Income characteristics suggest, for instance, that the rural poor are less vulnerable, and the urban poor more vulnerable, to macroeconomic policy shocks. The reason is that the cushioning effect of consumption from own-agricultural production is not as high

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<sup>3</sup>In Ghana in 1992 the rural poverty rate was 34 percent, whereas the urban poverty rate was 26.5 percent (Canagarapajah and Mazumdar, 1997).

<sup>4</sup>In Ghana, for instance, the sharp reduction in the rural poverty rate between 1987 and 1992 (from 42 percent to 34 percent) was the result of a significant increase in the income generated by the poor from non-farm self-employment. According to Canagarapajah and Mazumdar, (1997, p. 44), the share of such income in total household income increased from 19.5 percent in 1987-88 to 25.7 percent in 1991-92. At the same time, the share of income generated from farm self-employment fell during the same period from 60.4 percent to 53 percent

in the case of the urban poor. At the same time, the urban poor tend to benefit more than the rural poor from food subsidies. Thus, large cuts in government subsidies may have a larger effect on the urban poor. Both examples suggest that studies focusing on the effects of stabilization programs on the poor should focus more on the evolution of urban poverty in Latin America, whereas those focusing on sub-Saharan Africa should focus more on the behavior of rural poverty rates—and expect macroeconomic variables to play a much less significant role, compared to structural factors.

Nevertheless, there are at least two reasons to suggest that understanding and assessing the effect of macroeconomic factors on urban poverty even in the context of sub-Saharan African countries is important. First, measures of rural and urban poverty rates—such as those discussed by Sahn et al. (1997, Chapter 2)—are often made on the basis of expenditure data that are not properly deflated across regions, owing to the lack of appropriate regional deflators. Accounting for the difference between the cost of living between urban and rural areas is nevertheless crucial for poverty assessment, in part because prices are typically higher in urban areas. Mazumdar (1993) for instance estimates that in Kenya in the late 1980s, the nominal income differential between rural and urban areas was as high as 4:1, and the cost of living in urban areas was 60 percent higher.<sup>5</sup> Without price indices (and thus relative weights) that account for consumption patterns in both areas, the difference between the incidence of poverty in rural and urban areas is most likely overstated. Second, in many countries rapid rural-to-urban migration has affected the regional distribution of poverty in the past few years.<sup>6</sup> In such cases, urban poverty, although not as severe as it is in rural areas, may be a growing problem.<sup>7</sup> Given the worsening trend of poverty in urban areas in sub-Saharan Africa and the growing importance of the informal sector, it is important to understand the dynamics of this sector at both the micro- and macroeconomic levels in order to design effective policies aimed at assessing urban poverty.

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<sup>5</sup>These results are not general; in Ghana for instance, Canagarajah and Mazumdar (1997, p. 36) do not find differentials as large as those observed in Kenya.

<sup>6</sup>Both population and urbanization growth rates are very high in sub-Saharan Africa compared to other regions of the developing world.

<sup>7</sup>In Ghana for instance, the rural poverty rate declined sharply between 1987 and 1992 (as noted earlier) but little progress was achieved in reducing urban poverty (which remained at 26.5 percent in 1992).

### 3 Transmission Channels

Short-run stabilization policies may affect poverty through various channels. Analytically, it is convenient to distinguish between direct channels, such as direct effects on public sector employment or income through changes in transfers and subsidies), and indirect effects operating through

- changes in aggregate demand (or output, if excess capacity initially exists) and employment;
- changes in the rate of economic growth;
- changes in inflation and the relevant expenditure price deflator for the poor;
- changes in the real exchange rate.<sup>8</sup>

#### 3.1 Government Expenditure

The direct channels through which stabilization programs affect the poor operate through public sector layoffs and cuts in government expenditure on transfers and subsidies.<sup>9</sup> In the absence of a safety net (or unemployment benefit scheme), fiscal consolidation through public sector layoffs may raise directly the poverty rate. A sharp reduction in transfers reduces income directly, whereas a reduction in subsidies on goods or services that are consumed by the poor lowers their purchasing power.<sup>10</sup> Both may worsen poverty, with the latter effect depending on the consumption-expenditure pattern of the poor.

However, there are various factors that suggest that measuring the effect of macroeconomic factors by only looking at aggregate measures of expenditure to assess their effect on the poor may be misleading. It may be argued, for instance, that public sector layoffs (particularly of the less-productive workers), to the extent that they lower overall government expenditure and reduce pressures for monetization of the fiscal deficit, may lower inflation

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<sup>8</sup>Indirect effects through portfolio shifts (and capital gains and losses) are typically limited because the poor hold their assets mostly in the form of noninterest-bearing money. There may, of course, be a large effect on *relative* poverty through this channel, to the extent that upper-income groups hold more diversified portfolios of assets.

<sup>9</sup>Government spending on transfers and subsidies also have an indirect effect on aggregate demand, as discussed later.

<sup>10</sup>This has often been seen as a reflection of the lack of political influence of the poor, and pressures exerted by more powerful interest groups.

and therefore generate a beneficial effect for the poor (see below). The net welfare effect, therefore, is ambiguous because of conflicting effects on income. Similarly, in addition to the **level effect** associated with reductions in public expenditure, there may be a **compositional effect**: the share of social spending in total government expenditure may actually increase at the same time that overall spending is being cut. Moreover, transfers and subsidies may fall both as a percentage of GDP and as a percentage of total government expenditure without any adverse effect on poverty if, at the same time, improved targeting of social spending takes place—thereby improving the flow of services to the poor. Indeed, in some programs, expenditure reforms have led to a redirection of health and education expenditures toward basic/preventive health care and primary education, and an improvement in the targeting of social safety nets—notably by transforming generalized transfers to households into transfers targeted to the poor.

Expenditure reallocation continues to be a major issue in the design of stabilization programs; the lack of political influence of the poor, and pressures exerted by more powerful interest groups, often represent major stumbling blocks. The point, however, is that in cases where they occur in such a way that they benefit the poor, the net effect of fiscal consolidation may be beneficial—even if the relative level of public expenditure falls.

### 3.2 Aggregate Demand and Employment

Indirect effects of stabilization programs on poverty may occur through both direct and indirect effects on the level of aggregate demand and employment. The direct effect results essentially from reductions in government expenditure other than wages and salaries, and transfers and subsidies. The most important component here are cuts in capital expenditure—which often occurs in practice, due to the difficulty of cutting the wage bill. By reducing aggregate demand and employment,

At the same time, there are various indirect channels through which stabilization measures affect aggregate demand; most operate through changes in private spending:

- if public investment and private sector investment are complementary (as the evidence for most developing countries suggests), a cut in public sector investment—in addition to its direct effect on aggregate demand indicated earlier—may reduce the productivity of the private capital stock at the margin, and thus reduce private investment and aggregate demand;

- an increase in taxes such as an increase in tax rates on wages or profits, may reduce private expenditure on consumption and investment;<sup>11</sup>
- restrictive credit and monetary policies may also lower private expenditure on consumption and investment, either directly or by raising interest rates.<sup>12</sup>
- If the reduction in public spending results in a net reduction in aggregate demand at the original level of prices and interest rates, domestic activity would fall, but this could also lead to an increase in private expenditure: for instance, if domestic interest rates adjust downward immediately to maintain portfolio equilibrium with a reduction in the demand for money, interest-sensitive components of aggregate demand would tend to increase, or, alternatively, if portfolio imbalances tend to persist, the excess supply of money may cause households to increase current spending in order to lower their real holdings of money balances (real balance effect).
- Even in the absence of a real balance effect, the reduction in financing requirements by the public sector may reduce the cost or increase the availability of financial resources for the private sector, thereby increasing private spending;
- if nominal wages are flexible, or if the cut in public spending was foreseen at the time that currently prevailing nominal wage contracts were entered into, the domestic price level could fall sufficiently to increase private spending by an amount equivalent to the decrease in public spending, with no net change in total aggregate demand.

The foregoing discussion suggests, therefore, that the effects of stabilization policies on poverty operating through changes in aggregate demand are less clear-cut as is often thought. Although there are various channels through which such policies may reduce aggregate demand and worsen poverty (by reducing employment), there are also channels through which they may lead to an increase in aggregate demand and employment. Moreover, to the extent that reductions in aggregate demand associated with sta-

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<sup>11</sup>In principle, to the extent that the reduction in public spending leads to an equal reduction in perceived tax liabilities by the private sector (either because of an immediate reduction in taxes currently paid, or in the future owing to lower financing needs to retire public debt) current or future disposable income will increase, resulting in an increase in private spending. The net effect on aggregate demand would be, in this case, ambiguous

<sup>12</sup>These effects may be exacerbated in the presence of wage and price stickiness.



bilization policies also lead to a fall in inflationary pressures (as discussed below) they may also benefit the poor.

### 3.3 Economic Growth

Stabilization policies may affect the poor not only through their impact on the **level** of output but also its **growth rate** over time. The evidence suggests, indeed, a close and negative link between poverty and growth: Demery and Squire (1996), for instance, reviewing the survey-based evidence on poverty in a selected group of sub-Saharan African countries during the 1980s and 1990s, concluded that economic growth was the main factor accounting for changes in poverty. Figure 2, which shows the correlation between poverty rates (both rural and urban) and growth rates for a large group of developing countries for the period 1981-93, also suggests that high growth rates tend to be associated with low poverty rates.

Indirect effects of stabilization programs on poverty may occur through both direct and indirect effects on growth rates. Reductions in transfer payments from the public sector to the poor (which have no direct effect on aggregate demand) reduce disposable income and thus have an indirect, negative effect on private saving. Lower saving may affect the growth rate. As indicated earlier, cuts in public sector investment may reduce (increase) private investment in the complementary (substitutability) case, thereby lowering (raising) the rate of economic growth. Tax increases encourage evasion and the shifting of activities to the informal economy ; as can be inferred from the analysis in Loayza (1996), the loss in tax revenue may, in the longer run, reduce the government's capacity to invest in infrastructure and thus lower the rate of economic growth if there is complementary between public and private capital formation—thereby indirectly raising poverty rates.

At the same time, lower inflation tends to increase growth rates through its effect on the level and efficiency of investment. More generally, to the extent that stabilization programs are conducive to greater macroeconomic stability, they will lead to higher growth rates. Bleaney (1996), for instance, in a cross-section study covering the period 1980-90, shows that macroeconomic instability (particularly when measured by the fiscal balance and the degree of volatility of the real exchange rate) has a significant negative effect on the rate of economic growth and possibly also a negative effect on investment.<sup>13</sup> Rodrik (1998) obtains similar results for sub-Saharan Africa.

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<sup>13</sup>In contrast to some other studies, however, inflation loses its significance when the indicator of real exchange rate variability is introduced in Bleaney's regressions.

### 3.4 Inflation and Expenditure Deflators

The poor are more vulnerable to inflation than higher-income groups because of a variety of factors:

- their income (wages) is often defined in nominal terms, and they often do not benefit from indexation mechanisms; the evidence suggests indeed that real wages tend to fall in periods of high inflation;<sup>14</sup>
- they have few inflation hedges—few real assets, and usually no indexed financial assets—with which to insulate themselves from the effect of price increases;
- their holdings of cash balances are subject to the inflation tax, which, although not usually accounted for in measuring poverty levels, could have a significant negative effect on the welfare of the poor.<sup>15</sup>

All three factors suggest that inflation stabilization would benefit the poor proportionately more than upper-income groups. However, a number of mitigating factors should be taken into account. First, in countries where the poor are self-employed (either in the informal urban sector or in agriculture, as in many sub-Saharan African countries) what matters is not so much the increase in the overall level of prices but rather the extent to which prices of the goods and services that the poor consume (that is, a properly-weighted expenditure deflator) increase. If, for instance, basic staple foods account for a large share of expenditure of low-income households, and if the prices of these commodities are kept under control, disinflation may have little impact on the poor. Second, to the extent that stabilization entails a sharp drop in aggregate demand and employment (as discussed earlier), the excess supply of labor may, everything else equal, lead to further downward pressure on wages and a worsening of the plight of the poor.

Third, even if higher inflation has an adverse effect on poverty in the longer run, the foregoing discussion suggests that reducing inflation from a high to a low level may not be beneficial in the short run, to the extent that it is brought about through extensive cuts in social programs. Thus, as mentioned in the introduction, there is an intertemporal trade-off, which suggests that it is the net present value of a reduction in inflation that needs

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<sup>14</sup>For Latin America, see in particular Cardoso (1992) and Morely (1995).

<sup>15</sup>However, it is possible to envision a situation in which the counterpart to inflation tax revenue is a higher level of public expenditure, which may benefit the poor directly—thereby offsetting the initial effect of the tax on welfare.

to be assessed, in order to determine if price stabilization is beneficial to the poor or not.

The situation is, in fact, more complicated than that, because lower inflation also contributes indirectly to growth, as shown empirically by Bruno and Easterly (1998) and Sarel (1996). Higher growth rates increase the level of income per capita, and the higher level of income tends to lower measured poverty rates. One mechanism through which inflation affects growth is the following. Inflation drives a wedge between the marginal returns to real and financial capital; it thus distorts production incentives. The elimination of this distortion increases both the level and rate of growth of output. In the model developed by Gylfason (1996)—with real and financial capital are both used as inputs in the production process—increased price stability improves the efficiency with which capital is utilized, and thus increases the full-employment level of output in the long run (the static output gain). But lower inflation also increases the rate of economic growth in the presence of constant returns to (broad) capital, as emphasized in the new endogenous growth literature (Easterly, 1993). These gains can, in practice, be substantial as suggested by the simulations performed by Gylfason (1996). Thus, by lowering the level of inflation (and possibly the variability of inflation) stabilization programs enhance growth prospects by improving the allocation of resources, thereby enhancing their long-term benefits to the poor.

### 3.5 Real Exchange Rate

The combination of exchange rate, fiscal, and monetary policies implemented in stabilization programs often aims at achieving a depreciation of the real exchange rate, in order to foster a reallocation of resources toward the tradables sector. In turn, a real depreciation affects poverty (and income distribution) through two main channels:

- A real depreciation—brought about either through a nominal depreciation or a fall in the price of home goods—favors consumers of nontradables (such as housing and retail services) in general, and the urban poor in particular. However, in practice, a real depreciation is implemented through a nominal depreciation, which raises the domestic price of imported goods. To the extent that such goods are consumed by the poor, there is a negative income effect which may offset the relative price effect.
- A real depreciation tends to foster a reallocation of resources toward agricultural export activities, raising the income of export-crop farmers

and rural households (Dorosh and Sahn, 1993).<sup>16</sup> In countries where the poor are predominantly in the rural areas, a real depreciation will therefore raise incomes and reduce poverty.

However, there are other offsetting supply-side effects of a real exchange rate depreciation that must also be taken into account. Because resources are reallocated toward the tradables sector, the demand for labor in the nontradables sector may fall; lower employment and nominal wages (in the presence of downward rigidity of prices) may translate into a fall in real wages and a higher incidence of poverty. In particular, if the urban poor are also producers of nontraded goods (as is the case in the informal sector), the net aggregate effect of a reduction in rural poverty will be highly mitigated.

The real exchange rate depreciation that often accompanies stabilization programs (at least in their initial stages) may also generate indirect effects on poverty. For instance, it has been noted that a real depreciation has often been accompanied with an increase in the user cost of capital in the tradables sector, because capital goods (machinery and equipment) are often imported in developing countries (Lora and Olivera, 1998). This tends to lower investment in fixed capital and, as a result of complementarity, to reduce the demand for skilled workers. To the extent that skilled and unskilled labor are net substitutes, the demand for unskilled workers may increase, raising employment and average income of the poor.

### 3.6 The Role of the Labor Market

The thrust of the foregoing discussion is that there are a variety of channels—with possibly offsetting (direct and indirect) effects—through which stabilization programs affect poverty. The importance of each of these channels will in general depend on the institutional characteristics and structural parameters of individual economies. An important implication of the analysis is thus that empirical investigation is crucial for assessing the effect of macroeconomic factors on the poor.

Another implication is that the labor market is a crucial element in understanding poverty, because the poor generate most of their income from labor services. The way the labor market operates, in turn, conditions the employment and wage outcomes of stabilization policies. There are, of course, more general reasons than poverty itself for focusing on the role

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<sup>16</sup>Results of household surveys in sub-Saharan Africa suggest that not only do the poor sell agricultural output, but that tradable products, both exports and food crops, constitute a significant share of their agricultural earnings (Sahn et al., 1997, p. 32).

of the labor market in the process of macroeconomic adjustment; whether or not a real devaluation leads to a reduction in the current account deficit, for instance, depends largely on the extent to which real wages are flexible downward. Nevertheless, as long as labor market imperfections prevent an efficient allocation of resources, the poor are likely to be affected. More precisely, for studies focusing on the role of short-term macroeconomic factors on poverty, it is the urban labor market that plays a crucial role.

There are a number of important institutional characteristics of the urban labor market in developing countries.<sup>17</sup> In general, the urban labor market can be divided into formal employment (such as employment in large private enterprises and the public sector) and informal employment.<sup>18</sup> Because formal employment in many developing countries (in both Latin America and sub-Saharan Africa) has increased only slowly in recent decades, while urban migration has been extensive, informal urban employment has increased dramatically in size.<sup>19</sup> In Kenya, for instance, the share of the informal sector in employment outside agriculture is currently about 60 percent. In Ghana, between 1980 and 1990, employment in the formal sector declined significantly, despite a substantial increase (by 50 percent) of the non-agricultural labor force. Estimates by Canagarajah and Mazumdar (1997, p. 45) suggest that much of the expansion in the labor force was absorbed by the informal sector, whose size increased from 36 to 45 percent of the total (agricultural and non-agricultural) labor force. The urban poor are also disproportionately employed in the informal sector. In Chile, for instance, in 1994 30 percent of employment in the total population was informal; it was 45 percent amongst the poor (Anríquez, Cowan, and De Gregorio, 1998).

Workers in the formal sector typically have higher levels of education than informal sector workers; the reason is that formal sector firms have better technologies; operating these technologies require higher-skilled workers and more on-the-job-training. Higher wages allow firms to reduce turnover

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<sup>17</sup>See Agénor (1996) for a detailed overview of the literature, and Bigsten and Horton (1998) for a survey of labor markets in sub-Saharan Africa. See also the World Bank (1995). Marquez and Pagés-Serra (1998) review regulations governing hiring, firing, overtime work, social security contributions, minimum wages and collective bargaining in Latin America, and examines their impact on labor market outcomes.

<sup>18</sup>In some countries, public sector employment may represent a disproportionately large share of formal sector employment, because of the small size of the formal sector.

<sup>19</sup>The informal sector is defined in various ways; one common definition is that it includes self-employed workers (except for professionals) unpaid family workers, workers employed in small firms (less than, say, 5 or 6 workers), and those working in the trade and services sector without a contract.

costs for highly-skilled workers. A study of the manufacturing industry in Kenya, for instance, found a very significant effect of firm size on wages (Bigsten and Horton, 1998). The difference persists after controlling for (observable) labor quality differences and working conditions. Tenure is also longer in larger firms. Both facts suggest indeed that firms may pay more to reduce (costly) labor turnover. They may also pay more to enhance productivity, attract better workers, and maintain loyalty and morale, in line with efficiency wage theories.

The conventional view is that the urban informal labor market is characterized by ease of entry, a high degree of wage flexibility, and limited labor protection. However, despite the absence of restrictions to entry in the informal sector, urban open unemployment is often high in developing countries, and tends to affect both skilled and unskilled workers (which account for the majority of the poor). This evidence suggests that the extent of labor mobility between the formal and the informal sectors, although very high, is not perfect.

## 4 A Formal Framework

This section presents a macroeconomic model of a small open developing economy that provides a useful framework for the analysis of the role of the labor market in the transmission of macroeconomic policies to the poor.<sup>20</sup> Three categories of agents are assumed to operate in the economy considered: firms, households, and the government.<sup>21</sup> The nominal exchange rate is fixed. The economy consists of two major segments: the formal economy and the informal sector. The capital stock in each production sector is fixed within the time frame of the analysis. The labor force (which is also constant) is heterogeneous and consists of skilled and unskilled workers.

### 4.1 The Formal Sector

Production in the formal economy consists of an exportable good, and requires both types of labor. For simplicity, total output of exportables is

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<sup>20</sup>A useful analysis of the role of the labor market in the transmission process of macroeconomic policy shocks (namely, an expenditure-switching policy) on poverty is provided by Demery and Addison (1994). Their approach, however, remains partial equilibrium in nature. See also Bodart and Le Dem (1996).

<sup>21</sup>The model could be extended, along the lines described in Agénor (1997*b*), to introduce a trade union in the formal sector.

assumed to be sold abroad.<sup>22</sup> The price of exports is fixed on world markets; the demand for exports is thus infinitely elastic, implying that the volume of exports is supply-determined. Setting the world price of exports to unity implies that the domestic price of exports is thus equal to the nominal exchange rate,  $E$ . Let  $Y_X$  denote production of exportables sector,  $n_S$  and  $n_U$  employment levels of skilled and unskilled labor (measured in natural units), and  $e$  the level of effort provided by each skilled worker. The level of effort provided by an unskilled worker is constant and normalized to unity for simplicity. Assuming a Cobb-Douglas production technology yields<sup>23</sup>

$$Y_X = (en_S)^\alpha n_U^{1-\alpha}, \quad 0 < \alpha < 1. \quad (1)$$

Generalizing the specification developed by Agénor and Aizenman (1999), the effort function is defined as

$$e = 1 - \Lambda \left( \frac{\Omega}{\omega_S^c} \right)^\gamma, \quad 0 < \Lambda < 1, \quad \gamma \geq 0, \quad (2)$$

where  $\omega_S^c$  denotes the *consumption wage* for skilled workers in the exportable sector, and  $\Omega \leq \omega_S^c$  the reservation wage. Equation (2) indicates that an increase in skilled workers' consumption wage relative to their reservation wage raises the level of effort. Effort is also concave in  $\omega_S^c$ . If effort is independent of relative wages ( $\gamma = 0$ ), or if the consumption wage is equal to the reservation wage,  $e = 1 - \Lambda$ .<sup>24</sup>

Whereas skilled workers determine the level of effort on the basis of the consumption wage, producers determine only the *product wage*,  $\omega_S$ . Suppose that the consumer price index is a weighted, geometric average of the price of imported goods,  $E$ —assuming that the foreign-currency price of these goods is normalized to unity—and the price of nontradables,  $P_N$ :

$$P = E^{1-\delta} P_N^\delta, \quad 0 < \delta < 1, \quad (3)$$

where  $\delta$  measures the share of home goods in total expenditure.

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<sup>22</sup>The model can be extended to account for the existence of a sector producing importables, but at the cost of greater complexity.

<sup>23</sup>Note that the assumed technology implies that skilled and unskilled labor are Edgeworth complements in the production of exportables.

<sup>24</sup>An alternative way to introduce efficiency considerations in the formal sector would be to assume that production requires (as noted in the previous section) skilled workers to operate sophisticated equipment. Relatively high wages would then be required to minimize the turnover costs associated with that category of labor. Assuming that the quit rate is a function of the consumption wage would yield results that are qualitatively similar to those described below (see Agénor, 1997a).

Let  $z = E/P_N$  denote the relative price of imports in terms of nontradables;  $z$  will be referred to in what follows as the real exchange rate. By definition, therefore,  $P = z^{-\delta}E$ , so that

$$\omega_S^c = z^\delta \omega_S. \quad (4)$$

A binding minimum wage for unskilled workers is in place in the formal economy. For a given level of the minimum wage, firms in the formal sector determine employment levels and the product wage earned by skilled workers so as to maximize profits and minimize the cost of skilled labor in efficiency units. Formally, let  $\omega_m$  be the real minimum wage (measured in terms of the price of exportables) earned by unskilled workers in the formal sector. Assuming that firms incur no hiring or firing costs, the decision problem is thus

$$\max_{n_S, n_U, \omega_S} \Pi_X = \left\{ \left[ 1 - \Lambda \left( \frac{\Omega}{z^\delta \omega_S} \right)^\gamma \right] n_S \right\}^\alpha n_U^{1-\alpha} - \omega_S n_S - \omega_m n_U,$$

with  $z$  and  $\omega_m$  taken as given.

The first-order conditions for this optimization problem are:

$$\alpha \left( \frac{n_U}{en_S} \right)^{1-\alpha} \left[ 1 - \Lambda \left( \frac{\Omega}{z^\delta \omega_S} \right)^\gamma \right] = \omega_S, \quad (5)$$

$$(1 - \alpha) \left\{ \frac{n_U}{en_S} \right\}^{-\alpha} = \omega_m, \quad (6)$$

$$\alpha \gamma \left( \frac{n_U}{en_S} \right)^{1-\alpha} \Lambda \left( \frac{\Omega}{z^\delta \omega_S} \right)^\gamma = \omega_S. \quad (7)$$

The first two conditions equate the real net marginal product of each category of labor to the relevant real wage, whereas the third determines wages such that the level of effort is optimal. Conditions (5) and (7) can be solved to yield:

$$\omega_S = \frac{(1 + \gamma)^{1/\gamma} \Omega}{z^\delta} = \theta(z, \Omega), \quad \theta_z < 0, \theta_\Omega > 0, \quad (8)$$

which indicates that the efficiency wage for skilled workers is negatively related to the real exchange rate and positively to the opportunity cost of effort. For a given level of the product wage, real exchange rate depreciation (resulting from a fall in the price of nontradables), increases the consumption wage and thus tends to raise the level of effort—allowing firms to reduce the product wage in equilibrium.



The demand functions for labor can be derived from the above equations as:

$$n_S^d = n_S^d(\bar{\omega}_S; \bar{\omega}_m), \quad n_U^d = n_U^d(\bar{\omega}_S; \bar{\omega}_m). \quad (9)$$

Equations (9) indicate that an increase in the product wage for both categories of workers reduces the demand for both categories of labor.

Substituting these results in equation (1) and using (8) yields the supply function of exportables:

$$Y_X^s = Y_X^s(\bar{\omega}_S; \bar{\omega}_m) = Y_X^s(\bar{z}; \bar{\omega}_m). \quad (10)$$

## 4.2 The Informal Economy

Firms in the informal economy produce a nontraded good, which requires only unskilled labor and is used only for final consumption. The price of this good is flexible, and adjusts to eliminate excess demand.

Technology for the production of the nontraded good in the informal sector is characterized by decreasing returns to labor:

$$Y_N = n_N^\eta, \quad 0 < \eta < 1, \quad (11)$$

where  $Y_N$  denotes output of home goods, and  $n_N$  the quantity of labor employed in the informal economy. Producers maximize profits given by  $z^{-1}Y_N - \omega_N n_N$ , where  $\omega_N < \omega_m$  denotes the real wage in the informal sector, measured in terms of the price of exportables.<sup>25</sup> Profit maximization yields the familiar equality between marginal revenue and marginal cost,  $\omega_N = Y_N'/z$ , from which labor demand can be derived as

$$n_N^d = \left(\frac{\omega_N z}{\eta}\right)^{1/(\eta-1)}, \quad n_N^{d'} < 0, \quad (12)$$

where  $\omega_N z$  measures the product wage in the informal sector. Substituting equation (12) in (11) yields the supply function for goods produced in the informal sector:

$$Y_N^s = \left(\frac{\omega_N z}{\eta}\right)^{\eta/(\eta-1)}, \quad Y_N^{s'} < 0. \quad (13)$$

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<sup>25</sup>The condition that the minimum wage be higher than the informal sector is in fact necessary to prevent a solution in which, to begin with, unskilled workers have no incentive to seek employment in the formal sector.

### 4.3 Households

There are only two categories of households in the economy: an “upper-income” household which consists of all workers, skilled and unskilled, employed in the formal economy, and a “lower-income” household which consists of all workers employed in the informal economy. This structure is adopted for analytical tractability.<sup>26</sup> The key difference between upper- and lower-income households is that the former saves a fraction of its current disposable resources and accumulates wealth in the form of a tradable interest-bearing bond, whereas the latter spends all of its income. Both categories of households supply labor inelastically and consume, in addition to the nontraded good produced in the informal sector, an imported good which is imperfectly substitutable for the home good.

Consider first the upper-income household. Its income consists of total output of exportables,  $Y_X^s$ , and interest income on holdings of traded bonds,  $i^*B^*$ , where  $i^*$  is the world interest rate (assumed constant) and  $B^*$  the foreign-currency value of these holdings.<sup>27</sup> Total consumption expenditure,  $c_R$ , depends positively on both disposable income and current wealth:<sup>28</sup>

$$c_R = \alpha(Y_X^s + i^*B^* - T) + vB^*, \quad 0 < \alpha < 1, \quad v > 0, \quad (14)$$

where  $T$  (measured in terms of the price of exportables) denotes lump-sum taxes paid by the upper-income household.

The household’s stock of bonds,  $B^*$ , evolves over time according to

$$\dot{B}^* = Y_X^s + i^*B^* - T - c_R,$$

that is, using (14):

$$\dot{B}^* = (1 - \alpha)(Y_X^s + i^*B^* - T) - vB^*. \quad (15)$$

The upper-income household consumes imported goods (in quantity  $c_R^I$ ) as well as home goods (in quantity  $c_R^N$ ). Assuming a Cobb-Douglas sub-utility function, the allocation of total consumption expenditure among

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<sup>26</sup>An alternative approach would be to assume that all unskilled workers, in both the formal and informal sectors, are poor. Empirical evidence suggests indeed that the average number of years of schooling of the poor tends typically to be lower than that of the total workforce. See, for instance, Anríquez, Cowan, and De Gregorio (1998) for Chile.

<sup>27</sup>More generally, it could be assumed that upper-income households hold, in addition to foreign bonds, domestic assets (such as land). To avoid complicating the analysis further, domestic sources of wealth accumulation are ignored in what follows.

<sup>28</sup>Life-cycle models would predict a relationship between life-cycle wealth and consumption, rather than income and current wealth. However, in the presence of liquidity constraints current income also affects expenditure. See the evidence for developing countries discussed by Khayum and baffoe-Bonnie (1994) and Vewdyannathan (1993).

these goods is given by

$$c_R^I = (1 - \delta)c_R, \quad c_R^N = \delta z c_R, \quad (16)$$

where  $\delta$ , as indicated earlier, measures the share of home goods in total expenditure.

Resources of the lower-income household (measured in terms of exportables) consist of total income generated in the informal economy,  $z^{-1}Y_N^s$ . All income is spent on consumption,  $c_P$ :

$$c_P = z^{-1}Y_N^s. \quad (17)$$

Assuming for simplicity an allocation rule across consumption goods that is similar to the upper-income household's yields

$$c_P^I = (1 - \delta)c_P, \quad c_P^N = \delta z c_P. \quad (18)$$

#### 4.4 The Market for Informal Sector Goods

The equilibrium condition of the market for informal sector goods can be written as:

$$Y_N^s = c_R^N + c_P^N.$$

Using equations (13), (16) and (18), this condition becomes

$$Y_N^s(\omega_N z) = \delta z(c_R + c_P). \quad (19)$$

#### 4.5 The Informal Labor Market

Consider now the informal labor market. The demand for labor is derived from profit maximization and is given by equation (12). Determining the supply of labor involves two steps. First, in line with the “luxury unemployment” hypothesis, skilled workers who are unable to obtain a job in the formal sector prefer to remain unemployed rather than seek employment in the informal economy.<sup>29</sup> Second, the supply of unskilled workers in the formal sector,  $n_U^s$ , is assumed to change gradually over time as a function of wage

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<sup>29</sup>Evidence supporting this hypothesis is provided also by Hirata and Humphrey (1991) for Brazil, Horton et al. (1994), and Banerjee and Bucci (1995) for India. Agénor (1996) provides a review of the evidence on skilled unemployment in developing countries. In general, of course, whether skilled workers who are not successful in applying for a job in the formal sector decide to seek employment (as unskilled workers) in the informal economy depends on factors such as the efficiency of on-the-job search activities, demotivation effects, and the degree of support from relatives.

differentials across sectors. Wage and employment prospects are formed on the basis of prevailing conditions in the labor market. Thus, denoting by  $n_U^p$  the constant number of unskilled workers in the labor force, the supply of labor in the informal sector,  $n_U^p - n_U^s$ , is also given at any point in time. The equilibrium condition of the labor market in the informal economy can consequently be written as

$$n_U^p - n_U^s = n_N^d(\omega_N z). \quad (20)$$

With wages in the informal sector adjusting continuously to equilibrate supply and demand for labor, this equation yields:<sup>30</sup>

$$\omega_N = \omega_N(\bar{z}, n_U^s), \quad \partial\omega_N/\partial z = -1, \quad (21)$$

which indicates that a depreciation of the real exchange rate has a negative effect on the market-clearing wage. This is because, with labor supply constant, labor demand cannot change—which in turn requires the product wage to remain constant. An increase in the number of workers seeking employment in the formal economy has a positive effect on the market-clearing wage.

Migration flows are determined by expected income opportunities, along the lines of Harris and Todaro (1970).<sup>31</sup> The expected wage in the formal economy is equal to the minimum wage weighted by the probability of being hired in the exportables sector. Assuming that hiring in that sector is random, this probability can be approximated by the ratio of currently employed workers to those seeking employment,  $n_U^d/n_U^s$ . The expected wage in the informal economy is simply the going wage, since there are no barriers to entry in that sector. Thus, the supply of unskilled workers in the formal sector evolves over time according to

$$\dot{n}_U^s = \beta \left\{ \frac{\omega_m n_U^d}{n_U^s} - \omega_N \right\}, \quad \beta > 0, \quad (22)$$

where  $\beta$  denotes the speed of adjustment. Implicit in the above formulation is the assumption that workers employed in the informal sector do not

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<sup>30</sup>Throughout the paper, all derivatives are evaluated at initial values of wages and the real exchange rate equal to unity.

<sup>31</sup>See Bhattacharya (1993) for a review of the literature on the Harris-Todaro model and, for a more critical view, Stark (1991). Note that in the present setup the Harris-Todaro framework is used to explain migration flows between the (urban) informal sector and the (urban) formal sector, rather than migration between the rural and the urban sectors.

engage in on-the-job search. As suggested by Agénor (1997a), this assumption can be motivated by the existence of informational inefficiencies. The labor market in many developing countries is characterized by the lack of institutions capable of processing and providing in a timely manner relevant information on job opportunities to potential applicants. As a result, search activities for unskilled workers in the formal sector often require, literally speaking, waiting for job offers at factory gates.

#### 4.6 Government

The government consumes only imported goods and finances its expenditure through lump-sum taxes on skilled workers:

$$T = g_I, \quad (23)$$

where  $g_I$  denotes the foreign-currency value of government imports.

#### 4.7 Dynamic Form

The dynamic structure of the model is derived in Appendix I. As shown there, the dynamics of the model, can be formulated in terms of the size of the unskilled labor force seeking employment in the formal economy,  $n_U^s$ , and the upper-income household's holdings of traded bonds,  $B^*$ . A key feature of the model is that, as implied by equation (22), in the long run the unskilled wage ratio—the ratio of wages earned by unskilled workers in the formal and informal sectors—must be equal to the inverse of the employment ratio in the formal economy:

$$\omega_m/\tilde{\omega}_N = \tilde{n}_U^s/\tilde{n}_U^d. \quad (24)$$

This equation indicates that, as long as the minimum wage exceeds the informal sector wage (as is the case here), unskilled unemployment will emerge in equilibrium. As shown in Appendix I, in addition to condition (24), in the steady state the current account must be in equilibrium. From the steady-state solutions of  $B$  and  $n_U^s$ , the equilibrium values of the “short-run” variables, the real exchange rate and the real wage in the informal economy, can be derived.

The steady-state equilibrium of the model is depicted in Figure 4. The locus  $BB$  gives the combinations of  $B^*$  and  $n_U^s$  for which bond holdings remain constant, whereas the locus  $LL$  depicts the combinations of  $B^*$  and  $n_U^s$  for which the size of the unskilled labor force seeking employment in the formal sector does not change over time. The stability condition described in

Appendix I, under the assumption that the world interest rate is negatively related to the economy’s stock of bonds, requires  $LL$  to be steeper than  $BB$ . The steady-state equilibrium obtains at point  $E$ . If the economy’s initial position is at, say, point  $A$ —characterized by a negative differential between the expected wage in the formal and the informal sectors, and a current account deficit—the transition toward the steady state will be characterized by a gradual reduction in bond holdings and a fall in the size of the unskilled labor force seeking employment in the formal sector. Beyond point  $A'$  (located on  $LL$ ), the expected income differential turns positive (because the continuous inflow of workers in the informal sector that occurs during the first phase of adjustment puts downward on wages there) and the supply of unskilled labor to the formal economy begins to increase. Holdings of foreign assets continue to decline, however, until the steady-state position is reached at  $E$ .

A graphical illustration of the partial, long-run equilibrium position of the labor market, adapted from Agénor (1997*b*), is presented in Figure 5. Panel A depicts the demand functions for labor in the formal sector. The demand curve for skilled labor,  $n_S^d$ , is downward-sloping, because it is negatively related to  $\omega_S$ , the wage earned by skilled workers. Skilled unemployment is given in Panel A by the distance between the supply of skilled labor and the equilibrium point on the demand curve (point  $G$ ). The demand curve for unskilled labor,  $n_U^d$ , is also downward-sloping because skilled and unskilled workers are gross complements. Curve  $HH$  in Panel B depicts the relationship between the supply of unskilled workers in the formal sector,  $n_U^s$ , given by equation (24), and employment of unskilled workers in the formal sector,  $n_U^d$ . It is derived by using the market-clearing condition (21)—taking  $z$  as given—to eliminate  $\omega_N$  in (24).  $HH$  has a positive slope that is greater than unity, as implied by the assumption that  $\omega_m > \omega_N$ . The difference between points  $B$  (located on the 45-degree line) and  $B'$  (located on  $HH$ ) gives unskilled unemployment. Curve  $VV$  is given by  $n_U^p - n_U^s$ ; it is thus a linear transformation of  $HH$ . It determines the supply of labor (and thus actual employment) in the informal economy (point  $B''$ ). Given the labor demand curve in the informal sector,  $n_N^d$ , the market-clearing wage is determined at point  $C$  in Panel C. The positive relationship between the skilled workers’ wage and the informal sector wage—obtained by combining (8), (21), and (24)—is displayed as curve  $WW$  in Panel D. Thus, unemployment of both categories of labor—“quasi-voluntary” unemployment of skilled workers and “wait” unemployment of unskilled workers—prevails in

equilibrium.<sup>32</sup>

## 5 Dynamics of Spending Cuts

The model developed in the previous section can be used to analyze the labor market and income effects of a variety of macroeconomic policy shocks that have often been part of stabilization programs implemented in developing countries. Given the illustrative nature of the exercise, this paper limits itself to an analysis of the impact and steady-state effects of a cut in government spending on imported goods.<sup>33</sup>

### 5.1 Steady-State Effects

As shown in Figure 6, a reduction in government spending on imported goods  $g_I$  leads in the long run to an increase in the stock of traded bonds and a reduction in the supply of unskilled labor in the formal sector. The new equilibrium is at  $E'$ , located at the intersection of the new curve  $B'B'$  and  $L'L'$ . Intuitively, the reduction in  $g_I$  has two effects. The first is that it lowers taxes and thus stimulates consumption of the upper-income household. At the initial level of supply of informal sector goods (that is, at the initial level of wages and the real exchange rate), the real exchange rate must appreciate. This appreciation raises skilled workers' efficiency wage in the formal sector; this tends to lower demand for both categories of workers. The reduction in labor demand lowers the probability of employment in the formal economy and thus expected income there. This tends to lower the supply of unskilled labor in the formal economy.<sup>34</sup>

The second effect results from the fact that a cut in public spending on imported goods lowers directly, at the initial structure of relative prices, the initial trade deficit; for the current account to remain in equilibrium,

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<sup>32</sup>Since there is no unemployment benefit scheme in the present framework, unemployed workers in the long run are implicitly assumed to either turn to a subsistence activity (home production) or to rely on relatives for their survival.

<sup>33</sup>In practice, government spending consists mostly of outlays on nontraded goods and services. In the present setting, however, there is only one home good, produced in the informal sector; governments do not generally consume such goods.

<sup>34</sup>Note that the initial, direct effect of the real appreciation is to increase the real wage (measured in terms of exportables) by the same amount, leaving the product wage in the informal sector constant. But the increase in the supply of labor in the informal sector (which results from the reduction in job seekers in the formal economy) exerts an additional effect which lowers  $\omega_N$ —and thus stimulates the supply of home goods, thereby reinforcing the effects of the initial real appreciation.

the surplus of the services account must increase. This can happen only through an increase in the stock of tradable bonds. Of course, both effects occur simultaneously; the reduction in the trade deficit that results from the reduction in public spending on imports is mitigated by the increase in the consumption of imported goods by the upper-income household. Because the demand for skilled workers falls, the long-run effect of the shock is an increase in the unemployment rate of skilled workers. Whether unemployment of unskilled workers rises or falls would seem to be a priori ambiguous; both the supply of, and the demand for, unskilled labor fall in the formal economy. As shown in Appendix I, however, it can be established that demand falls by more than supply; the net outcome is thus an increase in the *level* of unemployment, as well as the *rate* of unemployment of unskilled labor.

The increase in labor supply in the informal sector puts downward pressure on the market-clearing wage  $\tilde{\omega}_N$ —thereby outweighing the positive effect of the real appreciation.<sup>35</sup> The product wage there ( $\tilde{\omega}_N \tilde{z}$ ) unambiguously falls, thereby allowing labor demand to increase as well. Thus, informal sector wages are procyclical (relative to output in the formal economy), whereas output and employment in that sector are countercyclical.

## 5.2 Transitional Dynamics

The transitional dynamics associated with a reduction in government spending on imported goods are also illustrated in Figure 6. The impact effects operate in the same direction as the long-run effects described earlier: an increase in consumption of domestic and imported goods of the upper-income household, a real appreciation, a rise in skilled workers' wages, and a reduction in the demand for both categories of workers. The reduction in labor demand lowers the probability of employment (and thus expected income) in the formal economy. The effect of the real appreciation on the product wage in the informal economy is now completely offset by an *increase* in the real wage there; as a result, the differential between expected wages in the formal and informal sectors unambiguously falls—therefore reducing on impact the flow of labor in the formal economy ( $\dot{n}_U^s(0) < 0$ ). The reason why impact movements in  $z$  and  $\omega_N$  exactly offset each other is because  $n_U^s$  cannot change on impact. As a result, the product wage in the informal sector,  $z\omega_N$ , cannot change either, as can be inferred from equation (20).

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<sup>35</sup>As indicated in (21), for a given level of  $n_U^s$ ,  $\omega_N$  must exactly offset movements in  $z$ . However,  $\omega_N$  depends also on  $n_U^s$ ; the fall in  $n_U^s$  put downward pressure on informal sector wages.



Thus, output and employment in the informal sector remain also constant on impact.

The fall in output of exportables (which results from the increase in skilled workers' wage) and the expansion in consumption tend to increase the trade deficit. However, the cut in government spending on imports outweighs these other effects so that on impact the trade balance improves. Because the stock of traded bonds cannot change on impact, the current account must also improve—the counterpart of which is an outflow of capital, or an increase in the stock of traded bonds held by the upper-income household ( $\dot{B}_0^* > 0$ ). Over time, the adjustment process leads the economy monotonically from point  $E$  to point  $E'$ , where the current account is again in equilibrium and expected wages between the formal and informal sectors are equal.

What happens to poverty rates during the adjustment process? Suppose that the legal minimum wage is used as the poverty line, and that average income in the informal sector,  $Y_N^s/n_N^d$ , is less than  $\omega_m$ . Suppose also that the unemployed earn an (imputed) income from own production that is also less than  $\omega_m$ . Poverty can thus be measured in the present framework by the headcount index,  $I_H$ , defined as the number of workers employed in the informal sector, plus unemployed workers in the formal economy, divided by the size of the labor force,  $n$ :

$$I_H = \frac{n_N^d + (n_S^p - n_S^d) + (n_U^s - n_U^d)}{n},$$

or equivalently, given that  $n = n_S^p + n_U^s + n_N^d$ :

$$I_H = 1 - \left( \frac{n_S^d + n_U^d}{n} \right).$$

On impact, as indicated earlier, employment in the informal sector does not change, because the product wage remains constant. The supply of unskilled labor in the formal economy remains also constant. Thus, poverty increases as a result of the fall in the demand for both skilled and unskilled labor in the exportables sector. This is also the case in the long run. The main reason for this outcome, however, is that in the long run the real exchange rate *appreciates*. In turn, the reason for this is, of course, the fact that in the present setting the cut in government spending is associated with a reduction in taxes—and thus an expansion in private spending. Choosing alternative deficit financing rules, or consumption behavioral rules, would generate very different outcomes, implying for instance only a short-run

increase in poverty. For instance, if the cut in spending lowers the degree of monetization and the inflation tax, the poor (assuming that they hold their assets in cash) would benefit from stabilization, as indicated earlier. Nevertheless, the point that the model illustrates is that the poverty effects of stabilization policies operate through complex channels involving changes in aggregate demand and supply, and changes in relative prices and wages. The labor market plays a critical role in the transmission process.

## 6 Empirical Evidence

The thrust of the foregoing discussion is that it is sometimes difficult to draw clear-cut theoretical conclusions regarding the effect of macroeconomic variables on poverty. Somewhat surprisingly, however, empirical analysis in this area has been limited. This section begins by reviewing some recent studies. It then presents some preliminary econometric results for a cross-section of countries.

### 6.1 Factual, Econometric, and Simulation Studies

Existing studies analyzing the effect of macroeconomic factors on poverty consist of three main types: factual, econometric, and macro-simulation studies. Some of the factual studies focusing on Latin America have suggested, for instance, that the poverty impact of expenditure policies adopted in the context of stabilization (and structural adjustment) programs during the 1980s has often been negative.<sup>36,37</sup> Among the econometric studies, Cardoso et al. (1995) and Amadeo and Neri (1997) have emphasized the adverse effect of inflation and unemployment on poverty in Brazil. Amadeo and Neri (1997), in particular, show that although inflation implies lower per capita income for all deciles of the distribution, its effect on per capita earnings is lower for the upper-income households. Put differently, inflation has a higher effect on earnings of the poor than on average per capita income.

Another factual study that attempts to assess the effect of macroeconomic adjustment on poverty in sub-Saharan Africa is by Demery and Squire

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<sup>36</sup>See Cardoso (1992) and Morley (1995). Cardoso, for instance, has argued that stabilization worsened poverty in Brazil because fiscal adjustment led to a reduction in social expenditures. The issue, however, is quite complex, as discussed earlier.

<sup>37</sup>It should be noted that the issue of the counterfactual is often forgotten in factual empirical studies aimed at assessing the link between stabilization programs and poverty. Too often the process of adjustment is blamed for the increase in poverty, without considering what would have happened in the absence of adjustment.

(1996). They use the macroeconomic policy index developed by the World Bank (1994) to do so.<sup>38</sup> They show that improvements in macroeconomic management (as captured by changes in the policy index) are associated with a decline in the incidence of poverty. More specifically, Demery and Squire find that for the six African countries that they consider—Côte d’Ivoire, Ethiopia, Ghana, Kenya, Nigeria, and Tanzania—poverty fell in countries that improved their macroeconomic policy regime and deteriorated in the one case (Côte d’Ivoire) in which it did not.<sup>39</sup> Depreciation of the real exchange rate was a key factor in the macroeconomic adjustment process; it also affected favorably rural incomes, benefitting the poor both directly and indirectly.

Some other studies have used simulation techniques to examine the effect of macroeconomic policy shocks on poverty. In particular, several recent papers focusing on sub-Saharan Africa have used computable general equilibrium (CGE) models for this purpose. Subramanian (1996), for instance, evaluates the impact of government policies (as well as external shocks) on poverty in Cameroon. Another study is the one by Sarris (1996), who examines the effects of various macroeconomic policy shocks (a 20 percent devaluation, an increase in public investment spending financed by a corresponding reduction in public current expenditure, and a reduction in public sector employment) in a CGE model for Tanzania. All shocks result in short-term declines in real income for rich and poor alike. However, losses for the non-poor are significantly higher than the losses incurred by the poor (rural and urban), reflecting the losses in implicit rents. In the longer term, however, with output growth rates increasing and inflation falling, income gains are significant for both the poor and middle-income households. Other studies include Bourguignon, de Melo, and Suwa (1991).

A limitation of most existing CGE models, however, is that the wage formation mechanisms that are embedded in these models often do not capture the complex intersectoral relationships that are observed in practice.

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<sup>38</sup>The index combines fiscal, monetary, and exchange rate policies. The fiscal component of the index, for instance, is based on the overall fiscal balance and total revenue. Scores are applied on a consistent basis to performance in each of these areas and then added to arrive at the fiscal component of the index. A similar procedure is followed for the exchange rate and monetary components. The (aggregate) index is a weighted average of performance in each of these three areas of macroeconomic management, with weights given by the relative importance of each component in determining growth, as captured through cross-country regression analysis.

<sup>39</sup>The evidence is based on household sample surveys covering the 1980s and 1990s. As discussed in the first part of this paper, poverty in these countries is predominantly rural, with much of it occurring among small-scale farmers and among the self-employed.

As illustrated in the analytical model presented earlier, for instance, feedback effects between formal and informal sector wages play a critical role in the transmission process of macroeconomic shocks in a context in which efficiency considerations matter in the determination of formal sector wages. It is therefore important to understand better the differences that may arise between wage formation across sectors and account for them in quantitative models.<sup>40</sup> A possible approach is the one proposed by Krebs and Maloney (1998). They develop an efficiency wage model with labor turnover from a fully-specified individual optimization problem, estimated econometrically the resulting quit rate function (using survey data for Mexico), and used the results to calibrate a macroeconomic model and assess the effect of various macroeconomic shocks on wages and employment. This methodology can in principle be extended to CGE models in order to consider various categories of households and address poverty issues.

## 6.2 Cross-Country Econometric Results

This section presents, in a cross-section empirical framework, some preliminary results on the relationship between macroeconomic factors and poverty. The macroeconomic variables examined include several of the variables discussed earlier, public expenditure, inflation, income growth, and the real exchange rate. The estimation method is a simple cross-country OLS regression. As discussed in Appendix II, the sample is relatively small (at most 38 observations) and only one data point is available for each country. More specifically, the variables are defined as follows:

- the dependent variable is the logarithm of the poverty rate ( $LPOV$ ), measured by the headcount index for the population as a whole;
- $INFL$  is the inflation rate in consumer prices;
- $LGOVCONS$  is the log of the ratio of government consumption expenditure over GDP, which aims at capturing *level* effects of changes in public spending;
- $LTRANS$  is the log of the ratio of subsidies and other current transfers in percent of GDP, which also aims at capturing *level* effects of changes in public expenditure;

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<sup>40</sup>For some recent work in this direction, see Maechler and Roland-Host (1995).

- *LTRANS* is the log of the ratio of subsidies and other current transfers in percent of expenditure, which aims at capturing *compositional* effects of changes in public spending;
- *LREALY* is the log of GNP per capita in constant 1987 US dollars, and captures the level of development;
- *REALGR* is the annual growth rate of real GNP per capita;
- *LREALXL* is the log of the real effective exchange rate index (defined such that an increase is a depreciation);
- *REALLEX* is the annual rate of change of the real effective exchange rate;
- *LURBAN* is the log of the relative share of the urban population relative to the total population.

The previous discussion suggests that inflation should have a positive effect on poverty, whereas income per capita, the growth rate, and the urbanization rate should have a negative effect. The effect of the real exchange rate is a priori ambiguous. The fiscal variables also have a priori an ambiguous effect. The effect of an across-the-board cut in transfers and subsidies, for instance, may be negative; but to the extent that it is accompanied by better targeting, there may be no significant effect on the poverty rate.

Figures 7 and 8 show scatter diagrams between the poverty rate and six macroeconomic variables: the growth rate of real GNP per capita, inflation, the ratio of subsidies and other current transfers in proportion of GDP and in proportion of total government expenditure, and the level and rate of depreciation of the real exchange rate.<sup>41</sup> The partial correlations suggest, for both the full sample of developing countries (a maximum of 38 observations) and the group of sub-Saharan African countries (a maximum of 16 observations) that poverty is negatively related to the rate of growth of output per capita, the ratio of subsidies and transfers (both in proportion to GDP and in proportion of expenditure), and positively related to inflation. The relationship between poverty and the real exchange rate does not appear to be significant.

Tables 1 to 5 provide more formal econometric estimates of these links. Table 1 presents regression results for the whole sample of countries (38

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<sup>41</sup>In order to account for possible lagged effects, both current period  $t$  values, averages over periods  $t$  and  $t - 1$ , and periods  $t, t - 1$ , and  $t - 2$  were used. The results presented in Figures 5 and 6 and Tables 1 to 5 refer to averages over periods  $t$  and  $t - 1$ .

observations) when the ratio of government consumption expenditure over GDP is used to measure the level effect of fiscal variable. The results suggest that inflation has always a significant, positive effect on the poverty rate. The coefficient of the real growth rate of income per capita, although negative (as predicted), is not significant.<sup>42</sup> The coefficient on income per capita, by contrast, is negative and always highly significant. The urbanization ratio, the fiscal variable, and the real exchange rate (either in level form or in rate of change form) do not have a stable effect.<sup>43</sup>

Table 2 shows results obtained when the ratio of transfers and subsidies in GDP is used as the fiscal variable, for the group of countries for which the data are available (24 observations). Inflation again has a significant impact on poverty in all regressions; all other variables do not appear to have a well-determined effect. The share of transfers and subsidies has the expected negative sign but is borderline significant only where real income per capita is excluded (regressions 3, 5 and 7). When both variables are included, the share of transfers and subsidies becomes insignificant.

Table 3 displays regression results when the relative share of transfers and subsidies in total expenditure is used to measure the compositional effects of fiscal policy for the sample of countries for which the data are available (again, 24 observations). The results are broadly similar to those obtained earlier; in particular, inflation and real per capita income remain highly significant. The share of transfers and subsidies has the expected negative sign but is again significant only when real income per capita is excluded (regressions 5 and 7); when both variables are included, the share of transfers and subsidies in total expenditure becomes insignificant. Finally, regressions similar to those in Tables 1 to 3 with *both* the share of transfers and subsidies in GDP and in total expenditure were also performed. In no regression were both variables significant, as long as per capita income was also included as a regressor.

Table 4 presents regression results for the sub-sample of sub-Saharan African countries. The number of observations drops further (to 16 observations at most), raising questions about the validity of statistical inference

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<sup>42</sup>This is in contrast with some recent country experiences such as Chile, where studies have suggested that up to 80 percent of the reduction of poverty between 1987 and 1992 was due to growth, while the rest was due to changes in income distribution (Anríquez, Cowan, and De Gregorio, 1998).

<sup>43</sup>To test the possibility that the adverse effects of real exchange rate overvaluation may be particularly significant in the poorer countries, the level of real per capita income was interacted with the real exchange rate, in level and in rate of change form. However, the results (using both the full sample and the subsample of sub-Saharan African countries) did not prove significant and are not reported to save space.

in this context. Nevertheless, the overall results remain consistent with those obtained with the full sample. Inflation and real income per capita are highly significant, in all regressions. The real exchange rate is borderline significant in regression (6), suggesting that a real depreciation lowers poverty—perhaps by raising income of rural households, as indicated earlier. The results also suggest it is not so much the *level* of the fiscal variable that matters, but rather changes in the *composition* of public spending. Most importantly, and in contrast to results obtained for the full sample, regressions (10) and (12) show that *both* income per capita and the share of transfers and subsidies in total government expenditure affect significantly poverty, along with inflation.

To conclude, although the results discussed here are suggestive, it is important to note their limitations. Although we attempted to control for various macroeconomic effects, the small number of degrees of freedom limited the number of variables that could be included in the regressions. As a consequence, some structural factors (such as the degree of income inequality, years of schooling, or the relative share of expenditure on education and health in total public expenditure) were not included. This can imply misspecification and thus inaccurate inference and results. There are also severe limitations with the data. Measured poverty rates in the sample may be overstated to the extent that the measure of income reflects only market or market-related activities. Expanding the database used here (by combining time-series and cross section) would provide the possibility to expand the range of variables to be tested. Finally, it should be noted that the role of the labor market is only implicit (or indirect) in the regression framework used above. Extending the analysis to account explicitly for labor market variables would allow a more precise assessment of its importance in the transmission of macroeconomic policy to poverty.

## 7 Some Research Perspectives

This section discusses some possible areas of investigation that could prove fruitful in analyzing the links between macroeconomic factors and stabilization. Issues discussed include the asymmetric effects of the economic cycles on poverty, the role of intersectoral labor mobility, the link between macroeconomic volatility (which may or may not be policy-induced) and poverty, and the use of time-series techniques for empirical analysis.

## 7.1 Asymmetric Effects of Economic Cycles

Some recent studies—such as the study by Londoño and Székely (1997) on Latin America—have suggested that economic cycles have an asymmetric effect on poverty. Recessions tend to increase poverty, but expansions or recovery tend to have a more limited effect. One possible explanation is that recessions worsen poverty (as well as income distribution) because of an asymmetric effect on employment. In a recession, unskilled workers (who are often poor) are the first to lose their jobs as firms hoard the trained labor force (skilled workers) due to high turnover costs. This hypothesis, as indicated earlier, is consistent with some of the evidence on wage determination in developing countries.

This is in line with the conclusion reached by Londoño and Székely (1997), which suggests that although the 1990s have been a decade of recovery and stability in Latin America, poverty (and inequality) have not declined significantly. Thus, although a favorable macroeconomic outcome can facilitate poverty alleviation and improvements in income distribution, it is not a sufficient condition. For poverty to decline significantly in Latin America requires an increase in educational opportunities and an increased access to ownership of other productive assets.

## 7.2 Labor Mobility across Sectors

An important factor affecting the response of wages and employment levels (and thus poverty) to macroeconomic shocks, as illustrated in the model developed earlier, is the degree of intersectoral mobility of the labor force. The available evidence on the degree of labor mobility across sectors in developing countries is rather scant. In practice, labor mobility depends on a variety of factors, such as employment protection regulations (most notably administrative restrictions on hiring, plant closure and the lay-off of permanent labor, and the generosity of severance payments) and other microeconomic considerations, such as proximity and family ties. Fallon and Riveros (1989) take the fact that wage differentials have apparently tended to widen in favor of expanding (tradable) sectors in the urban sector in Argentina, Chile, Colombia, Mexico, and Uruguay as indicating less than perfect labor mobility. However, differences in the pattern of wage formation across industries may well explain such movements.

There is a need to extend analytical research on these issues.<sup>44</sup> Empiri-

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<sup>44</sup>Note that in the analytical framework described earlier, the size of the labor supply seeking employment in the formal economy does not depend on the speed of adjust-



cally also, there are relatively few studies (not only in sub-Saharan Africa, but in developing countries in general) that shed light on the issue of intersectoral labor mobility. One possibility is to follow the approach of Dickens and Lang (1985), which relies on switching regression analysis.<sup>45</sup> The Dickens-Lang method can be used to test for the presence of non-economic barriers to formal sector employment. Their approach suggests postulating a mechanism for allocation of workers between the formal and informal sectors in the absence of rationing, based on workers free employment choices. Assuming that workers have perfect information and would behave so as to maximize utility over their lifetime, then they would choose formal sector employment if the net present value of their income stream in the formal economy exceeded that of the informal sector. This proposition can be tested by a series of constraints on the switching regression. Essentially, if the hypothesis of workers' free choices of sectors is to be accepted, and tastes for the non-pecuniary aspects of employment are independent of individual characteristics (such as the place of residence, marital status, the level of education, and so on), then one would expect that the coefficients of the variables describing these characteristics in the switching equation to be equal to the coefficients in the two wage equations. Failure to accept this restriction can be viewed as *prima facie* evidence of non-economic barriers to employment in the formal sector.

In practice, assessing the degree of mobility between the formal and informal sectors is difficult because data on migration flows between these sectors are generally not available. However, the model developed earlier suggests that the ratio of formal sector wages (for workers with low qualifications) to informal sector wages can be a useful empirical proxy. The model, in fact, suggests an ambiguous effect of the wage differential on poverty, to the extent that the poor are viewed as consisting of all workers in the informal sector as well as the openly unemployed in the formal economy.<sup>46</sup> A fall in the formal-informal wage ratio, for instance, increases the flow of (low-skilled) workers to the informal sector. To the extent that these workers were previously unemployed, poverty would not change; but to the extent that they were initially employed in the formal sector, poverty would naturally increase. Similarly, a rise in the wage ratio would have an ambiguous effect on poverty because those workers who move to the formal sector to seek a job there may well be unsuccessful and end up joining the ranks of

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ment in the long run; only the transitional dynamics are affected.

<sup>45</sup>Leontaridi (1998) provides a more detailed discussion of the Dickens-Lang approach.

<sup>46</sup>This discussion assumes that the employment probability in the formal economy does not change significantly in the short run.

the unemployed. What the foregoing discussion suggests, nevertheless, is that adding the formal-informal sector wage ratio as an independent variable in the type of poverty regressions presented earlier may be one way to capture, with appropriate auxiliary assumptions, the effect of intersectoral labor flows on poverty rates.

### **7.3 Macroeconomic Volatility and Poverty**

There has been limited evidence on the effects of macroeconomic volatility—as measured, for instance, by the standard deviations of aggregate output and inflation—on poverty in developing countries in general, and sub-Saharan Africa in particular. This is important, because such volatility may be policy-induced. Evidence of a negative effect may provide an argument in favor of rules-based policymaking. The evidence for Latin America suggests that macroeconomic volatility has tended to worsen income distribution and increase poverty in the region. This outcome is explained in part by the fact that the poor are less well equipped to cope with economic shocks and that incomes of the poor are substantially more sensitive to changes in aggregate income than upper-income groups (Londoño and Székely, 1997). Extending this analysis to other regions—particularly in sub-Saharan Africa, where “stop-and-go” policies have often characterized macroeconomic management in some countries—would be worthwhile.

### **7.4 Time-Series Tests**

The use of time-series data to analyze the role of macroeconomic factors and other determinants of poverty rates in a single-country context would be an important step forward. To date, few studies have been conducted in that context. Among these are the studies by Cardoso (1992) and Cardoso et al. (1995). Time-series data would allow researchers to use an error-correction framework to distinguish between long-run factors (such as the degree of inequality, public expenditure on education and health) and short-term macroeconomic factors—including the asymmetric effect of business cycles alluded to earlier.

## **8 Summary and Conclusions**

The purpose of this paper has been to examine analytically and empirically the various channels through which stabilization policies affect poverty in developing countries, with a particular emphasis on the role of the labor

market. Macroeconomic policies must, of course, be evaluated in terms of their macroeconomic objectives; in addition, however, it is important to understand their short-term impact on poverty.<sup>47</sup> This issue has been the subject of renewed interest in studies of economic adjustment in developing countries.

The first part of the paper provided a review of the evidence on poverty, with particular attention to the recent experience of Latin America and sub-Saharan Africa. The second part provided an analytical overview of the various channels through which macroeconomic policies affect the poor. It was argued, in particular, that a reduction in government expenditure on transfers and subsidies (whether it is measured as a proportion of GDP or as a proportion of total spending) does not necessarily hurt the poor if it is accompanied by a better targeting of benefits.

The third part presented an analytical framework that captures some of the main features of labor markets in developing countries—a large informal sector, efficiency wages and minimum wage legislation in the formal economy, and imperfect mobility of the unskilled labor force across sectors. Unemployment of both skilled and unskilled workers was shown to emerge in equilibrium, despite wage flexibility in the informal sector. Skilled unemployment emerges because the opportunity cost of leisure is low and/or the reservation wage is higher than the going wage in the informal sector, whereas unskilled unemployment results from “wait” or “queuing” considerations in the tradition of Harris and Todaro (1970). The model was used to study the macroeconomic effects of fiscal adjustment, namely a reduction in government spending. The analysis suggested, in particular, that a reduction in government spending on imports leads in the long run to an increase in unemployment of both categories of labor and an increase in poverty rates—with the poor defined as the unemployed and those workers employed in the informal sector. However, it was noted that these results were very sensitive to the structure of the model and, in particular, on the financing rule of government expenditure. A cut in spending that would lead to a lower degree of monetization and thus lower inflation could generate a positive effect on the incomes of the poor and thus reduce the incidence of poverty in the long run.

The fourth part provided a brief overview of some of the existing empirical studies focusing on the effect of macroeconomic adjustment on poverty,

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<sup>47</sup>At the same time, it is important to note that poverty is a multi-dimensional concept—encompassing the notions of lack of access to adequate access to health services and sanitation, a high degree of illiteracy, and deprivation of basic rights and security.

and presented some preliminary cross-country econometric results focusing on some of the factors identified in the previous sections, such as output growth, the real exchange rate, real government expenditure (distinguishing both level effects and compositional effects, as measured for instance by the share of subsidies and other transfers in total public expenditure), and inflation. Although the results should be treated with care given the short sample size, they suggest that inflation has an adverse effect on poverty. Subsidies and other transfers (both in proportion of GDP and in proportion of total government expenditure) do not have a significant effect in the full sample, but the share of subsidies and other transfers in proportion of government expenditure appears to be significantly correlated with poverty in sub-Saharan Africa. One implication of the result on inflation, of course, is that at least in this dimension there is no “trade-off” between stabilization and the objective of poverty reduction. Cuts in the share of transfers and subsidies in total government expenditure seem to have a significantly adverse effect on poverty, particularly in sub-Saharan Africa. Nevertheless, further empirical analysis is necessary to corroborate these results and understand better the effect of stabilization policies (and adjustment measures, more generally) on the poor.

The last part discussed various research perspectives. It was noted, for instance, that informal evidence suggests that economic cycles tend to have an asymmetric effect on poverty; recessions tend to increase poverty rates, but expansions or recovery tends to have a limited effect. One reason may be labor hoarding: the poor (relatively unskilled workers) tend to lose their jobs faster in a downturn, possibly because of higher training and turnover costs for the more skilled.<sup>48</sup> Testing for such effects is, however, difficult in many cases because it requires sufficiently long time-series. An extension of the cross-country econometric results presented here to explicitly account for the structure of the labor market and the role of labor market variables in the transmission of macroeconomic policy shocks would be an important area of investigation. For instance, labor market regulations, by reducing the demand for unskilled labor in the formal economy may tend to raise poverty in both the short and the long term.<sup>49</sup> The experience also suggests that countries that have managed to reduce poverty dramatically have all typically been able to increase the demand for unskilled labor rapidly. To the

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<sup>48</sup>The higher incidence of unemployment at lower levels of income has effects not only on poverty but also income distribution.

<sup>49</sup>Fallon and Lucas (1993) showed that in Zimbabwe job security regulations (including restrictions on firms’ ability to dismiss redundant workers) reduced employment by increasing adjustment costs and reducing efficiency.

extent that labor market imperfections hamper the creation of jobs, there may be a close link between reforms aimed at improving the functioning of the labor market and policies aimed at alleviating poverty in developing countries.

## Appendix I Solution and Dynamic Form

The first step in solving the model is to determine the short-run market-clearing solutions of the real exchange rate and the real wage in the informal sector (measured in terms of the price of exports). To do so, substitute (10) in (14) to give

$$c_R = \alpha[Y_X^s(z) + i^*B^* - T] + vB^*.$$

This equation can be written as

$$c_R = \phi(\bar{z}^+, \bar{B}^*; \bar{T}). \quad (\text{A1})$$

where

$$\phi_z = \alpha(\partial Y_X^s / \partial z), \quad \phi_{B^*} = \alpha i^* + v, \quad \phi_T = -\alpha.$$

A real depreciation, an increase in the stock of traded bonds, or a fall in taxes stimulate consumption.

Similarly, substituting (13) in (17) yields

$$c_P = z^{-1}Y_N^s(\omega_N z). \quad (\text{A2})$$

Using the equilibrium solution for  $\omega_N$ , equation (21), in (A2), and using (A1), the equilibrium condition of the market for nontraded goods, equation (19), can be written as

$$Y_N^s[\omega_N(z, n_U^s)z] = \delta z[\phi(z, B^*; T) + c_P],$$

that is, using (A2):

$$Y_N^s[\omega_N(z, n_U^s)z] = \frac{\delta}{1 - \delta} z \phi(z, B^*; T). \quad (\text{A3})$$

Equation (A3) can be solved for the equilibrium real exchange,  $z$ :

$$z = \theta(n_U^s, \bar{B}^*; \bar{T}), \quad (\text{A4})$$

where

$$\theta_{n_U^s} = -\Omega^{-1}Y_N^{s'}\left(\frac{\partial \omega_N}{\partial n_U^s}\right), \quad \theta_{B^*} = \frac{\delta(\alpha i^* + v)}{\Omega(1 - \delta)}, \quad \theta_T = -\frac{\alpha \delta}{\Omega(1 - \delta)}.$$

and, with a ‘~’ denoting a steady-state value:

$$\Omega = Y_N^{s'}\left(1 + \frac{\partial \omega_N}{\partial z}\right) - \frac{\delta}{1 - \delta}(\tilde{c}_R + \phi_z),$$

that is, because the first term in the expression for  $\Omega$  is zero from (21):

$$\Omega = -\frac{\delta}{1-\delta}[\tilde{c}_R + \alpha(\frac{\partial Y_X^s}{\partial z})] < 0,$$

An increase in taxes, for instance, lowers consumption of the upper-income household and creates excess supply in the market for informal sector goods. The real exchange rate must therefore depreciate to restore equilibrium.

Substituting this result in the informal labor market equilibrium condition (equation (21)) yields:

$$\omega_N = \kappa(n_U^+, B^*; \bar{T}). \quad (\text{A5})$$

where

$$\kappa_{n_U^s} = (\frac{\partial \omega_N}{\partial z})\theta_{n_U^s} + (\frac{\partial \omega_N}{\partial n_U^s}), \quad \kappa_{B^*} = (\frac{\partial \omega_N}{\partial z})\theta_{B^*}, \quad \kappa_T = (\frac{\partial \omega_N}{\partial z})\theta_T.$$

An increase in the supply of unskilled labor in the formal sector, for instance, creates an excess demand for labor in the informal economy, thereby putting upward pressure on wages there.

The second step is to substitute (10) for  $Y_X^s$ , (A4) for  $z$  in the resulting equation, and the government budget constraint (23) to eliminate  $T$  in the upper-income household's budget constraint, equation (15). This gives

$$\dot{B}^* = (1-\alpha)[Y_X^s[\theta(n_U^s, B^*; g_I)] + i^*B^* - g_I] - vB^*,$$

which can be written as

$$\dot{B}^* = G(n_U^s, B^*; \bar{g}_I), \quad (\text{A6})$$

with

$$G_{n_U^s} = (1-\alpha)(\frac{\partial Y_X^s}{\partial z})\theta_{n_U^s},$$

$$G_{g_I} = (1-\alpha)[(\frac{\partial Y_X^s}{\partial z})\theta_T - 1] = -(1-\alpha)\left[1 - \frac{\alpha(\partial Y_X^s/\partial z)}{\tilde{c}_R + \alpha(\partial Y_X^s/\partial z)}\right].$$

and

$$G_{B^*} = (1-\alpha)[i^* + (\frac{\partial Y_X^s}{\partial z})\theta_{B^*}] - v,$$

that is

$$G_{B^*} = (1-\alpha)i^* \left[ 1 - \frac{\alpha(\partial Y_X^s/\partial z)}{\tilde{c}_R + \alpha(\partial Y_X^s/\partial z)} \right] - v \left[ 1 + \frac{(1-\alpha)(\partial Y_X^s/\partial z)}{\tilde{c}_R + \alpha(\partial Y_X^s/\partial z)} \right]. \quad (\text{A7})$$

In general, the sign of  $G_{B^*}$  is indeterminate. In what follows it will be assumed that the wealth effect, as measured by  $v$ , is sufficiently large to ensure that  $G_{B^*} < 0$ .<sup>50</sup>

The last step is to determine the flow changes in labor supply to the formal sector. Substituting (8) in the second equation of (9) yields  $n_U^d = n_U^d(z, \omega_m)$ , that is, using (A4):

$$n_U^d = L(\bar{n}_U^s, \bar{B}^*; \bar{g}_I).$$

Substituting this result, together with (A5) for  $\omega_N$  in (22) yields

$$\dot{n}_U^s = \beta \left\{ \frac{\omega_m L(n_U^s, B^*; g_I)}{n_U^s} - \kappa(n_U^s, B^*; g_I) \right\},$$

that is

$$\dot{n}_U^s = \beta \Psi(\bar{n}_U^s, \bar{B}^*; \bar{g}_I) \quad (\text{A8})$$

where

$$\Psi_{n_U^s} = \frac{\omega_m}{\tilde{n}_U^s} \left[ L n_U^s - \frac{\omega_m \tilde{n}_U^d}{\tilde{n}_U^s} \right] - \kappa_{n_U^s}, \quad \Psi_{B^*} = \frac{\omega_m L_{B^*}}{\tilde{n}_U^s} - \kappa_{B^*},$$

$$\Psi_{g_I} = \frac{\omega_m L_{g_I}}{\tilde{n}_U^s} - \kappa_{g_I},$$

Equation (A8) shows, in particular, that an increase in  $n_U^s$  tends to lower migration flows towards the formal economy, as a result of three effects. First, it lowers the demand for labor in the formal sector; the reason is that by increasing wages in the informal economy, it lowers the supply of informal sector goods, thereby requiring a real appreciation to maintain equilibrium in the market for these goods (see (A4)). As a result, the efficiency wage increases, thereby reducing the demand for both skilled and

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<sup>50</sup>Equation (A7) shows that if  $v = 0$ ,  $G_{B^*} > 0$ . It can be verified by looking at the stability conditions given below that in this case the model is unstable because the roots of the matrix of coefficients are of opposite sign. Note also that the higher  $\alpha$  is, the more likely will the condition  $G_{B^*} < 0$  be satisfied. In the particular case where  $\alpha = 1$ ,  $G_{B^*} = -v$ .



unskilled workers. Second, it lowers (at a given level of the demand for labor in the formal economy) the employment probability. These two effects combine to reduce the expected wage in the formal sector. Third, it lowers the supply of labor in the informal sector—which tends to increase the market-clearing wage, and thus the opportunity cost of queueing. All three effects combine to reduce migration flows from the informal sector to the formal economy.

Equations (A6) and (A8) represent the dynamic equations of the system. Using a linear approximation around the steady state yields

$$\begin{bmatrix} \dot{n}_U^s \\ \dot{B}^* \end{bmatrix} = \begin{bmatrix} \beta\Psi_{n_U^s} & \beta\Psi_{B^*} \\ G_{n_U^s} & G_{B^*} \end{bmatrix} \begin{bmatrix} n_U^s - \tilde{n}_U^s \\ B^* - \tilde{B}^* \end{bmatrix}. \quad (\text{A9})$$

Necessary and sufficient conditions for (A9) to be locally stable are that the matrix of coefficients has

- a negative trace ( $\beta\Psi_{n_U^s} + G_{B^*} < 0$ ), which guarantees at least one negative root;
- a positive determinant, which ensures that the roots are of the same sign:

$$\Delta = \beta(G_{B^*}\Psi_{n_U^s} - G_{n_U^s}\Psi_{B^*}) > 0.$$

The first condition is always satisfied. The second condition requires, as shown in Figure 4, that the slope of  $LL$  be steeper in absolute value than the slope of  $BB$ .

Using (A6) and (A8), it can readily be shown that a reduction in  $g_I$  lowers  $n_U^s$  and increases  $B^*$ :

$$\frac{d\tilde{n}_U^s}{dg_I} = \frac{\beta(\Psi_{B^*}G_{g_I} - \Psi_{g_I}G_{B^*})}{\Omega} > 0, \quad \frac{d\tilde{B}^*}{dg_I} = \frac{\beta(\Psi_{g_I}G_{n_U^s} - \Psi_{n_U^s}G_{g_I})}{\Delta} < 0,$$

Using these results, it can be established from (A4) and (A5) that the real exchange rate appreciates in the long run ( $dz/dg_I > 0$ ) and that wages in the informal sector fall ( $d\tilde{\omega}_N/dg_I > 0$ ). From (24),  $\tilde{n}_U^s = \omega_m \tilde{n}_U^d / \tilde{\omega}_N$ . The effect of  $g_I$  on the *level* of unskilled unemployment in the formal sector is thus

$$\frac{d(\tilde{n}_U^s - \tilde{n}_U^d)}{dg_I} = \left(\frac{\omega_m}{\tilde{\omega}_N}\right) \frac{d\tilde{n}_U^d}{dg_I} - \frac{\omega_m \tilde{n}_U^d}{\tilde{\omega}_N^2} \frac{d\tilde{\omega}_N}{dg_I} - \frac{d\tilde{n}_U^d}{dg_I},$$

that is

$$\frac{d(\tilde{n}_U^s - \tilde{n}_U^d)}{dg_I} = \left(\frac{\omega_m}{\tilde{\omega}_N} - 1\right) \frac{d\tilde{n}_U^d}{dg_I} - \frac{\omega_m \tilde{n}_U^d}{\tilde{\omega}_N^2} \frac{d\tilde{\omega}_N}{dg_I},$$

Because  $d\tilde{n}_U^d/dg_I < 0$  and  $\omega_m/\tilde{\omega}_N > 1$ , the first term on the right-hand side is negative. The second term is also negative, because  $d\tilde{\omega}_N/dg_I > 0$ . Thus, unemployment of unskilled labor also increases. The effect on the unskilled unemployment *rate* is

$$\frac{d}{dg_I} \left( \frac{\tilde{n}_U^s - \tilde{n}_U^d}{\tilde{n}_U^s} \right) = \frac{d}{dg_I} \left( 1 - \frac{\tilde{n}_U^d}{\tilde{n}_U^s} \right),$$

that is, using (24):

$$\frac{d}{dg_I} \left( 1 - \frac{\tilde{\omega}_N}{\omega_m} \right) = -\omega_m^{-1} \frac{d\tilde{\omega}_N}{dg_I} < 0.$$

Thus, the unemployment rate increases also, implying that labor demand falls by more than labor supply in proportional terms.

## Appendix II

### Data Sources and Country Lists

The main source of the data is the 1998 *World Development Indicators* CD-ROM produced by the World Bank. The variables are measured as defined in the text. the country groups are as follows.

Regressions with the complete sample are based on the following list of countries (year of observation in parentheses): Algeria (1995), Bangladesh (1995-96), Benin (1995), Burundi (1990), Chile (1994), Colombia (1992), Dominican Republic (1992), Ecuador (1994), El Salvador (1992), Gambia (1992), Ghana (1992), Guinea-Bissau (1991), Honduras (1992), India (1994), Indonesia (1990), Jamaica (1992), Jordan (1991), Kenya (1992), Lesotho (1993), Malawi (1990-91), Malaysia (1989), Mauritania (1990), Mauritius (1992), Morocco (1990-91), Nepal (1995-96), Nigeria (1992-93), Pakistan (1991), Paraguay (1991), Philippines (1991), Rwanda (1993), Sri Lanka (1990-91), Tanzania (1991), Thailand (1992), Togo (1987-89), Trinidad and Tobago (1992), Tunisia (1990), Uganda (1993), Venezuela (1989), Zambia (1993), Zimbabwe (1990-91).

Regressions for the sub-Saharan Africa sample are based on the following list of countries (year of observation in parentheses): Benin (1995), Burundi (1990), Gambia (1992), Ghana (1992), Guinea-Bissau (1991), Kenya (1992), Lesotho (1993), Malawi (1990-91), Mauritania (1990), Mauritius (1992), Nigeria (1992-93), Rwanda (1993), Sierra Leone (1989), Tanzania (1991), Togo (1987-89), Uganda (1993), Zambia (1993), Zimbabwe (1990-91).

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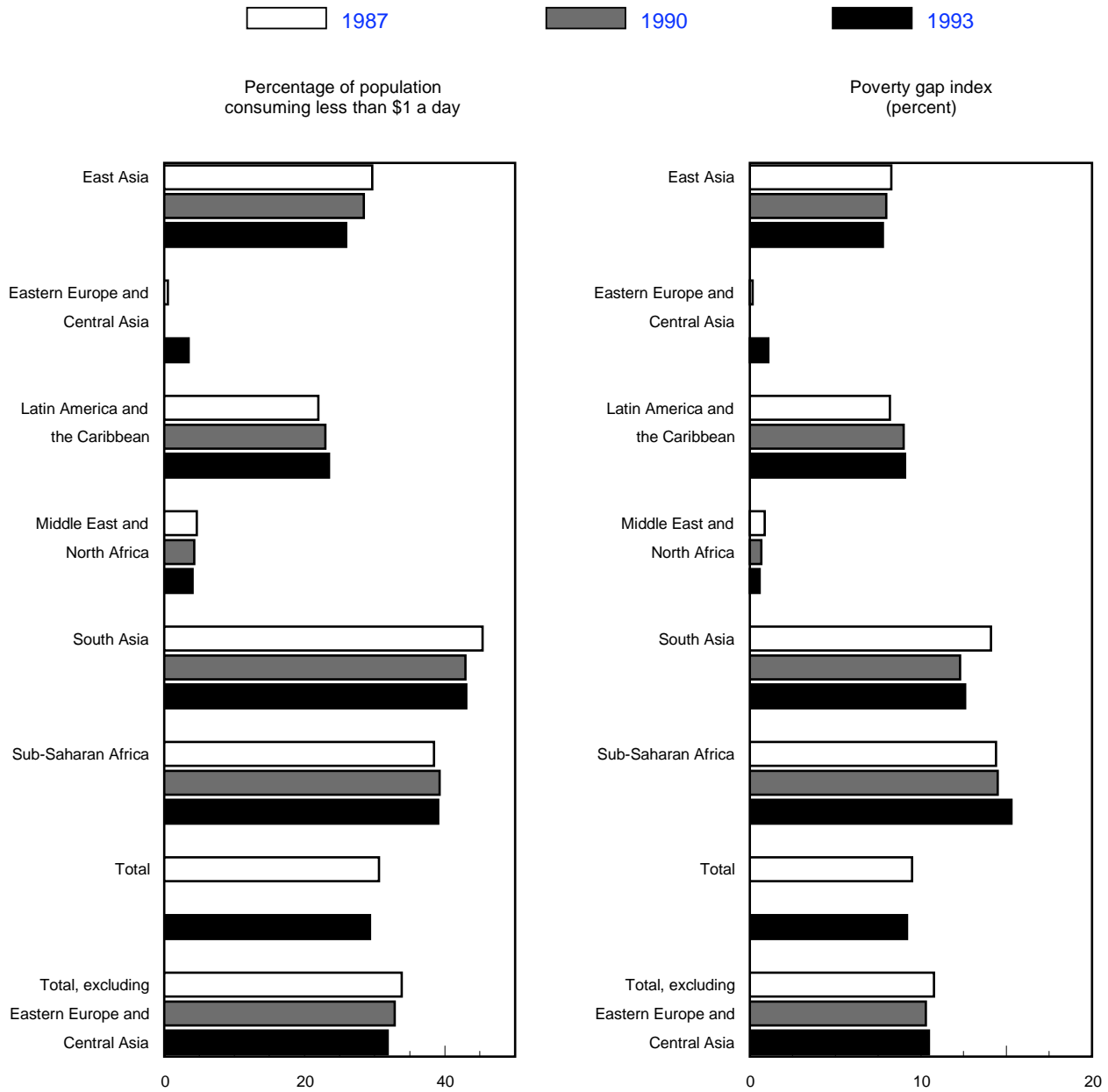
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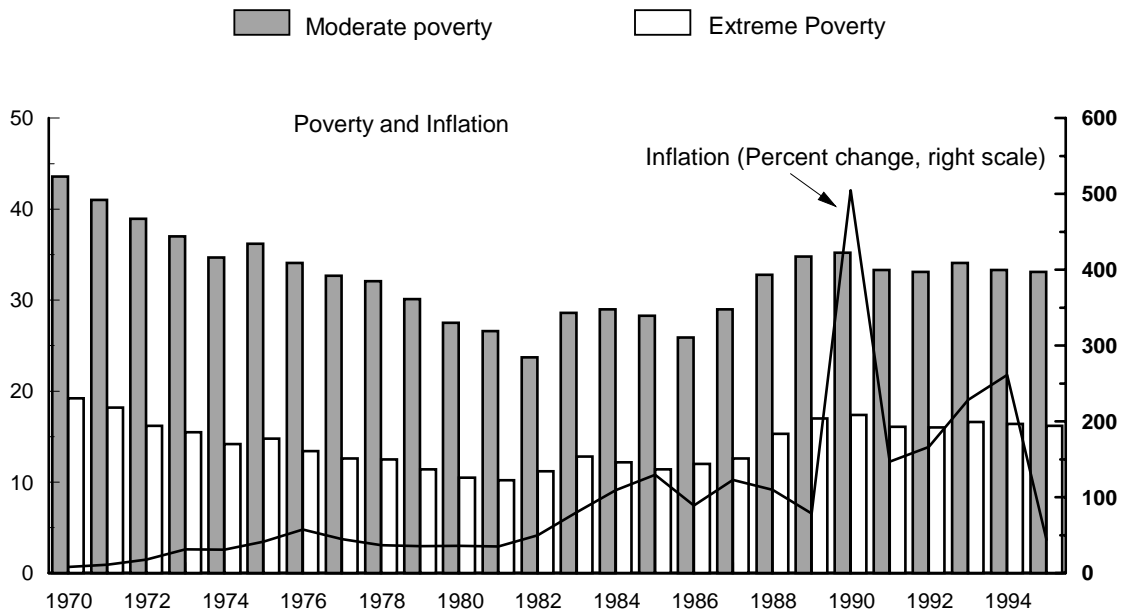
Figure 1  
 Developing Countries: Poverty Measures 1/



Source: Ravallion and Chen (1997, p. 374).

1/ Using an international poverty line of \$1 a day per person at 1985 purchasing power parity.

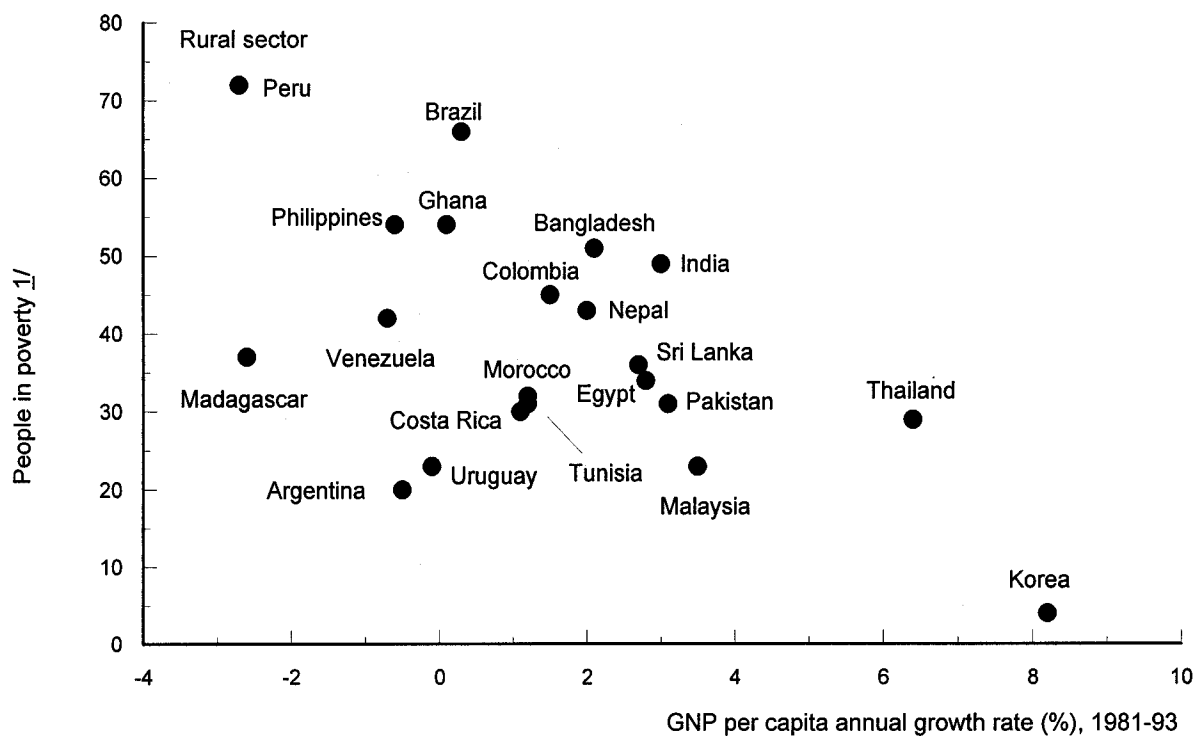
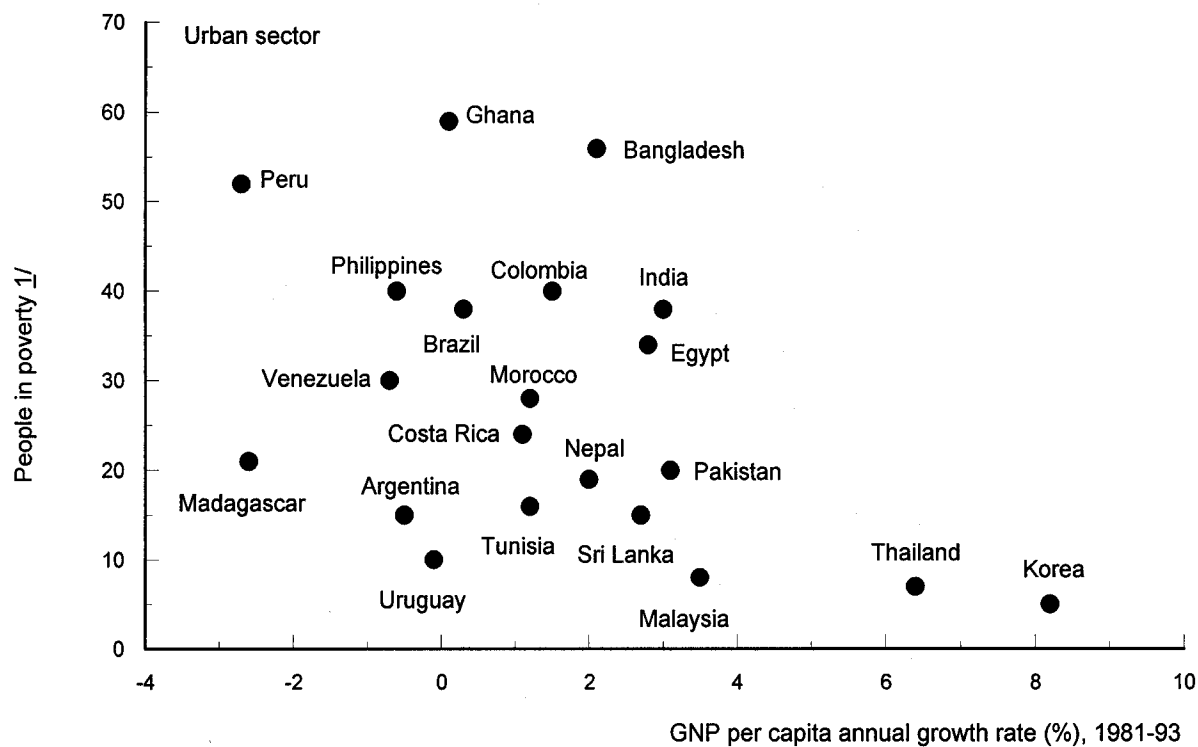
Figure 2  
Latin America: Poverty and Inflation, 1970-95 <sup>1/</sup>



Source: Londoño and Székely (1997) and *International Financial Statistics*.

<sup>1/</sup> Extreme poverty is one U.S. dollar a day, in 1985 ppp-adjusted U.S. dollars. Moderate poverty is two U.S. dollars a day, in 1985 ppp-adjusted U.S. dollars.

Figure 3  
Growth and People in Poverty  
(Period average, in percent)



Source: World Bank.

1/ Proportion of the population earning one U.S. dollar or less, in 1985 ppp-adjusted U.S. dollars, various survey years.

Figure 4  
Steady-State Equilibrium

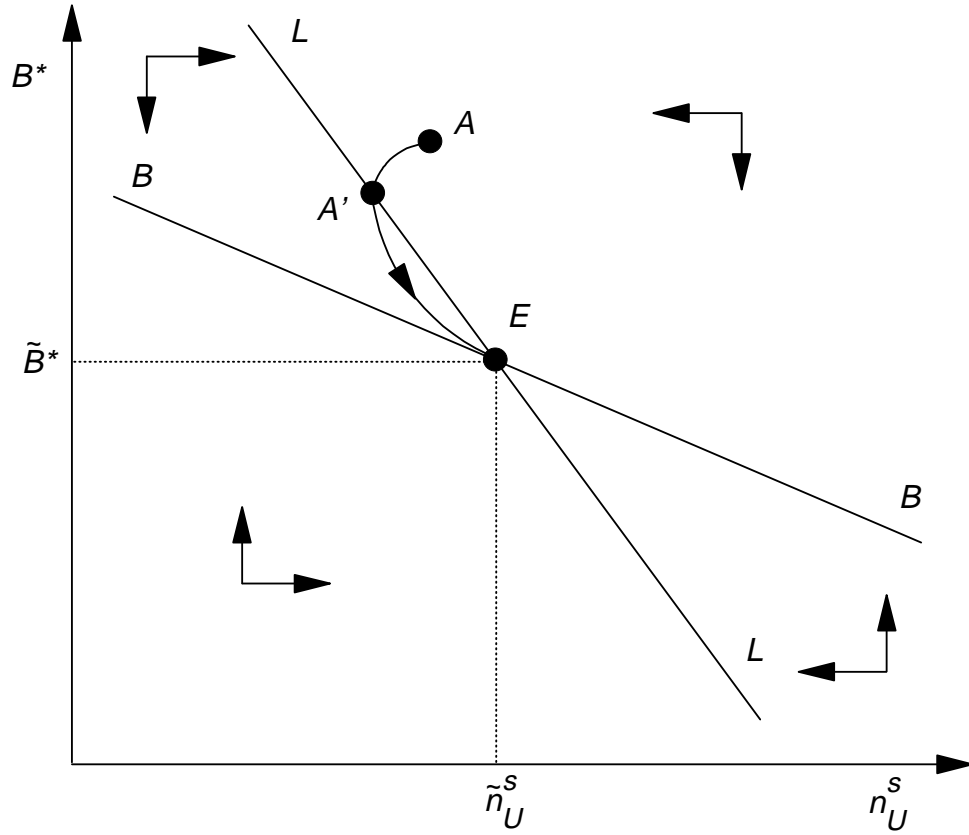
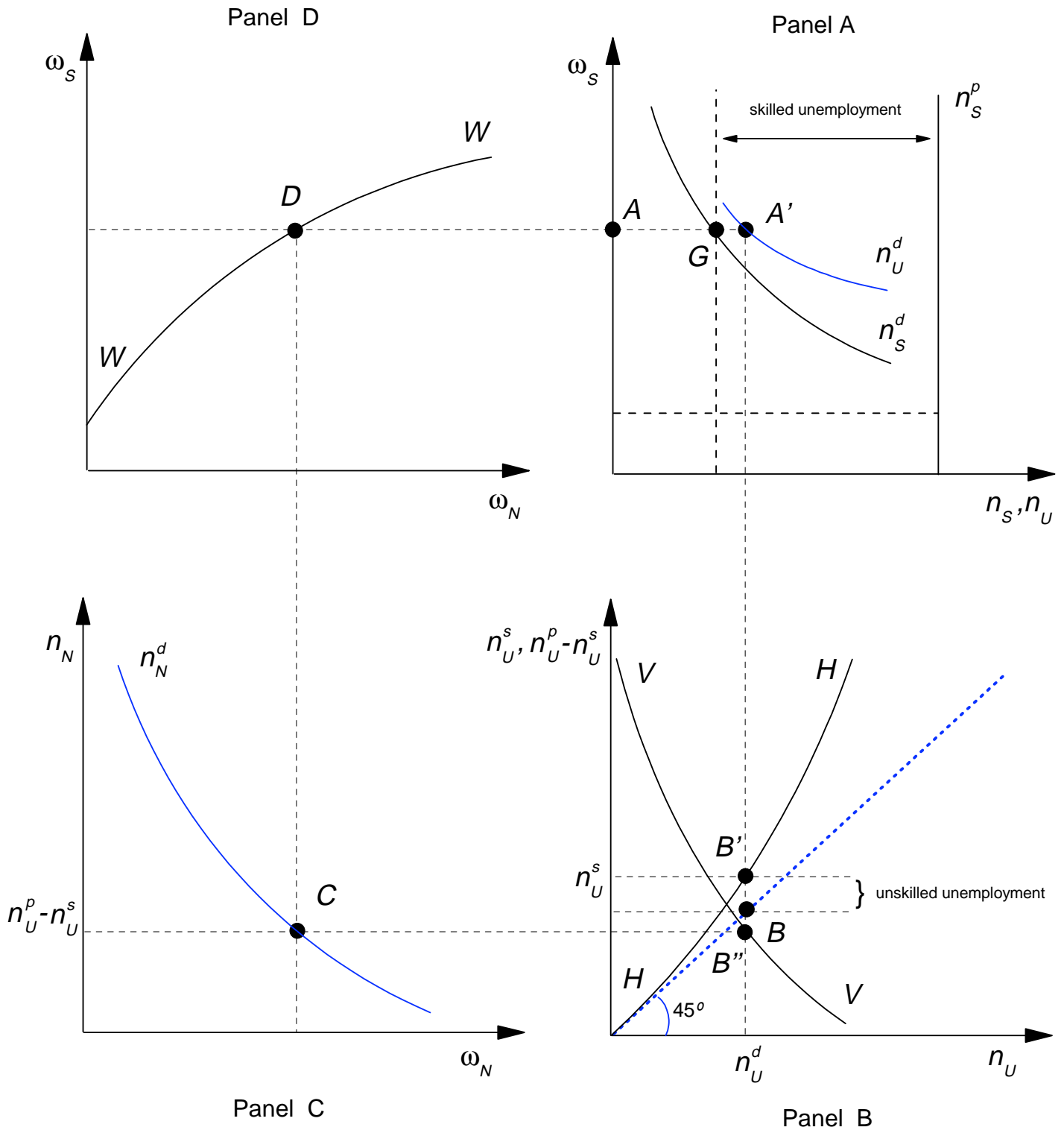


Figure 5  
Labor Market Equilibrium



Source: Agénor (1997b).

Figure 6  
Cut in Government Spending on Home Goods

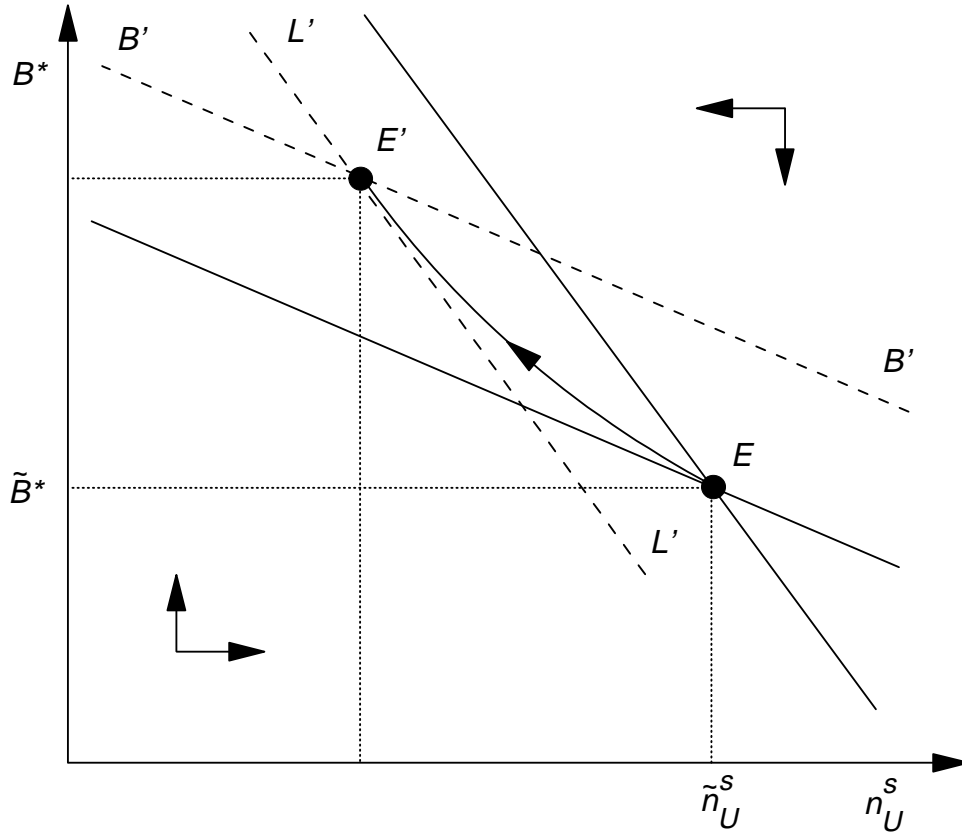
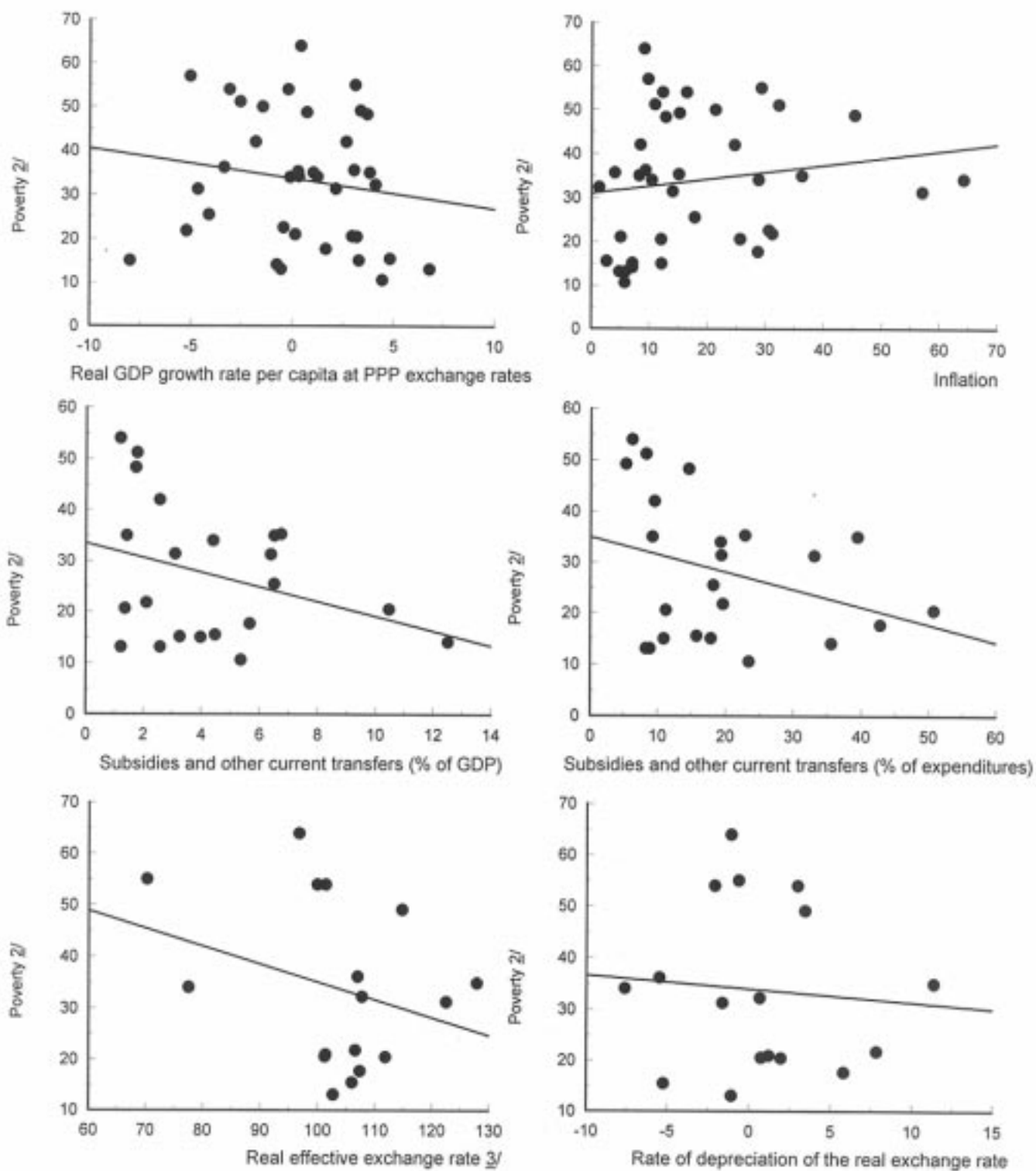


Figure 7  
 Developing Countries: Poverty and Macroeconomic Variables <sup>1/</sup>  
 (Various years, 1989 to 1995)



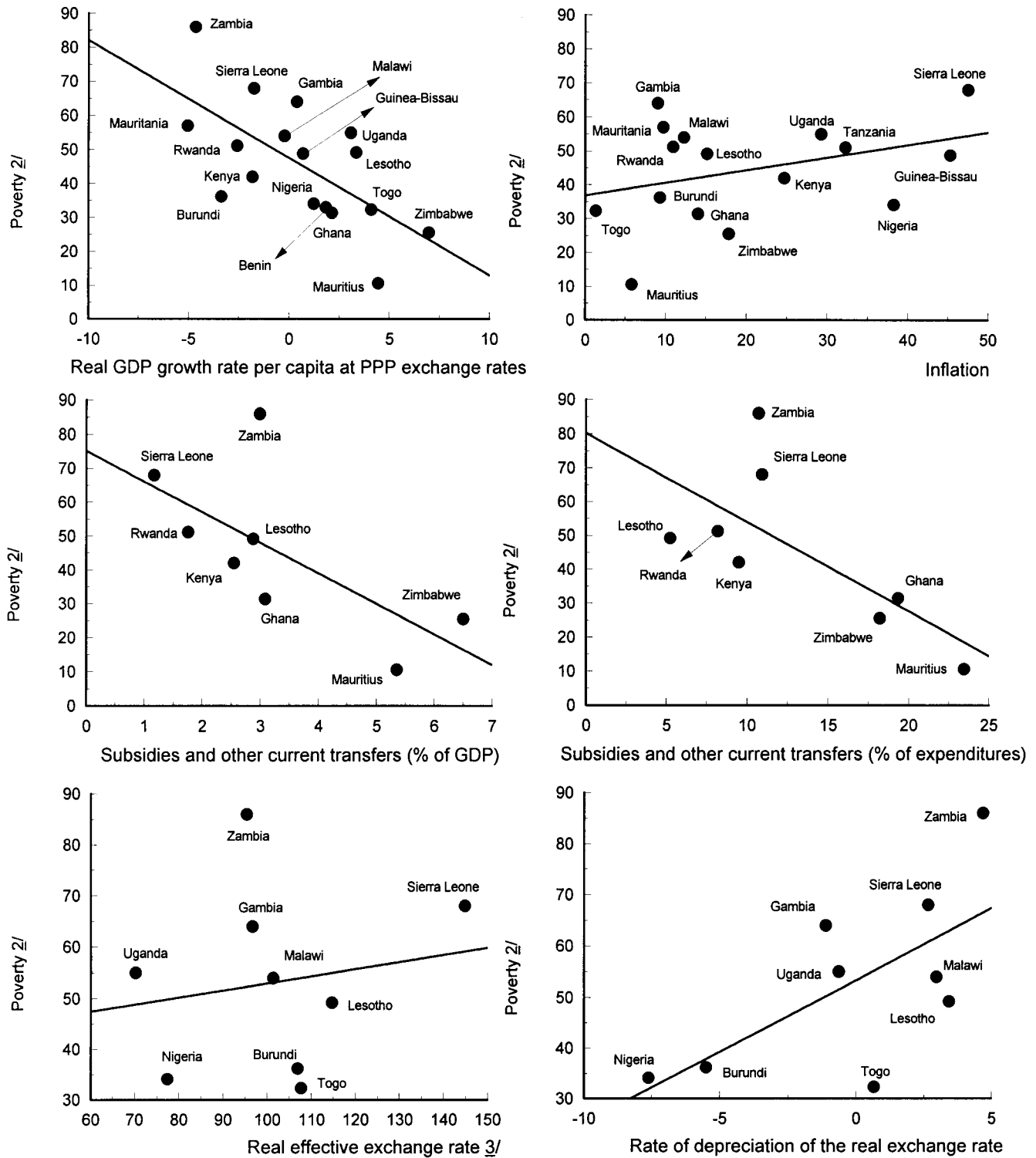
Source: World Bank.

<sup>1/</sup> Average inflation, expenditures, real effective exchange rate, and real GDP growth over poverty year and previous year.

<sup>2/</sup> Based on \$1 a day, defined in constant prices and measured in purchasing power parity dollars, for various years.

<sup>3/</sup> An increase is a depreciation.

Figure 8  
 Sub-Saharan Africa: Poverty and Macroeconomic Variables 1/  
 (Various years, 1989 to 1995)



Source: World Bank.

1/ Average inflation, expenditures, real effective exchange rate, and real GDP growth over poverty year and previous year.

2/ Based on \$1 a day, defined in constant prices and measured in purchasing power parity dollars, for various years.

3/ An increase is a depreciation.



**Table 1**  
**Regression Results: Macroeconomic Factors and Poverty**  
**(Whole sample with government expenditure)**

	Dependent variable: Log of poverty index							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	4.989 (7.092)	6.220 (8.788)	3.635 (5.146)	6.202 (8.979)	3.531 (4.734)	6.160 (8.468)	2.350 (1.002)	5.914 (3.269)
INFL	0.008 (3.264)	0.006 (2.721)	0.006 (2.300)	0.006 (3.039)	0.006 (2.271)	0.006 (2.992)	0.006 (2.262)	0.006 (2.997)
LGOVCONS	-0.115 (-0.492)	-0.119 (-0.599)	-0.115 (-0.421)	-0.116 (-0.595)	-0.069 (-0.234)	-0.102 (-0.486)	-0.144 (-0.512)	-0.121 (-0.606)
REALGR	-0.038 (-1.606)		-0.032 (-1.151)		-0.031 (-1.092)		-0.034 (-1.208)	
LREALY		-0.417 (-3.838)		-0.403 (-5.761)		-0.401 (-5.627)		-0.402 (-5.652)
REALEX					-0.008 (-0.487)			
LREALEXL							0.293 (0.575)	0.063 (0.172)
LURBAN	-0.399 (-3.718)	0.025 (0.177)						
Adj. R2	0.364	0.526	0.124	0.539	0.105	0.527	0.107	0.526
Number of obs.	38	38	38	38	38	38	38	38
Standard Error of Regression	0.425	0.367	0.499	0.362	0.505	0.367	0.504	0.367

Note: All independent variables are averages over the current period (for which poverty index is available) and one lagged value. C is the constant term. INFL is the annual change in consumer price index. LGOVCONS is the log of general government consumption in percent of GDP. REALGR is the annual growth of GNP per capita. LREALY is the log of GNP per capita in constant 1987 dollars. REALEX is the annual change in the real effective exchange rate index. LREALEXL is the log of the real effective exchange rate index. LURBAN is the log of the urban population in percent of total population. Figures in parentheses beneath coefficients are t ratios.

**Table 2**  
**Regression Results: Macroeconomic Factors and Poverty**  
**(Whole sample with government transfers in percent of GDP)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable: Log of poverty index								
C	4.425 (7.582)	6.181 (8.135)	3.360 (20.965)	6.168 (8.292)	3.362 (20.337)	6.209 (8.119)	0.596 (0.177)	8.272 (2.548)
INFL	0.008 (3.075)	0.006 (2.203)	0.007 (2.613)	0.006 (2.721)	0.008 (2.488)	0.006 (2.417)	0.008 (2.654)	0.006 (2.457)
LTRANSGDP	-0.166 (-1.049)	-0.171 (-1.281)	-0.275 (-1.757)	-0.158 (-1.236)	-0.282 (-1.634)	-0.133 (-0.944)	-0.303 (-1.875)	-0.126 (-0.917)
REALGR	-0.036 (-1.379)		-0.036 (-1.314)		-0.036 (-1.283)		-0.039 (-1.396)	
LREALY		-0.484 (-3.112)		-0.437 (-3.879)		-0.444 (-3.826)		-0.468 (-3.795)
REALEX					0.002 (0.096)			
LREALEXL							0.607 (0.822)	-0.417 (-0.667)
LURBAN	-0.321 (-1.888)	0.087 (0.444)						
Adj. R2	0.434	0.587	0.361	0.604	0.328	0.587	0.351	0.593
Number of obs.	24	24	24	24	24	24	24	24
Standard Error of Regression	0.440	0.376	0.468	0.368	0.480	0.376	0.472	0.374

Note: All independent variables are averages over the current period (for which poverty index is available) and one lagged value. C is the constant term. INFL is the annual change in consumer price index. LTRANSGDP is the log of the subsidies and other current transfers in percent of GDP. REALGR is the annual growth of GNP per capita. LREALY is the log of GNP per capita in constant 1987 dollars. REALEX is the annual change in the real effective exchange rate index. LREALEXL is the log of the real effective exchange rate index. LURBAN is the log of the urban population in percent of total population. Figures in parentheses beneath coefficients are t ratios.

**Table 3**  
**Regression Results: Macroeconomic Factors and Poverty**  
**(Whole sample with government transfers in percent of government expenditure)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable: Log of poverty index								
C	4.648 (7.562)	6.459 (8.357)	3.831 (8.138)	6.422 (8.555)	3.828 (7.951)	6.437 (8.497)	2.170 (0.629)	9.086 (2.940)
INFL	0.008 (3.043)	0.006 (2.143)	0.007 (2.561)	0.006 (2.646)	0.007 (2.325)	0.006 (2.310)	0.007 (2.546)	0.006 (2.376)
LTRANS	-0.089 (-0.512)	-0.122 (-0.851)	-0.237 (-1.425)	-0.106 (-0.788)	-0.232 (-1.368)	-0.096 (-0.706)	-0.241 (-1.416)	-0.080 (-0.586)
REALGR	-0.036 (-1.326)		-0.033 (-1.135)		-0.032 (-1.083)		-0.035 (-1.171)	
LREALY		-0.487 (-3.067)		-0.446 (-3.804)		-0.451 (-3.801)		-0.483 (-3.865)
REALEX					-0.009 (-0.431)	-0.014 (-0.805)		
LREALEXL							0.364 (0.486)	-0.541 (-0.889)
LURBAN	-0.345 (-1.913)	0.079 (0.391)						
Adj. R2	0.409	0.568	0.331	0.586	0.302	0.579	0.304	0.582
Number of obs.	24	24	24	24	24	24	24	24
Standard Error of Regression	0.450	0.384	0.479	0.376	0.489	0.380	0.488	0.378

Note: All independent variables are averages over the current period (for which poverty index is available) and one lagged value. C is the constant term. INFL is the annual change in consumer price index. LTRANS is the log of the subsidies and other current transfers in percent of expenditure. REALGR is the annual growth of GNP per capita. LREALY is the log of GNP per capita in constant 1987 dollars. REALEX is the annual change in the real effective exchange rate index. LREALEXL is the log of the real effective exchange rate index. LURBAN is the log of the urban population in percent of total population. Figures in parentheses beneath coefficients are t ratios.

**Table 4**  
**Regression Results: Macroeconomic Factors and Poverty (Sub-Saharan Africa)**

	Dependent variable: Log of poverty index											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
C	4.380 (3.892)	6.799 (6.322)	4.032 (3.828)	6.798 (6.611)	4.103 (3.861)	6.898 (7.488)	3.505 (19.692)	7.339 (11.888)	3.380 (3.148)	7.950 (53.672)	2.884 (2.774)	7.837 (37.231)
INFL	0.006 (2.156)	0.003 (1.629)	0.005 (1.982)	0.004 (1.871)	0.005 (1.707)	0.003 (1.646)	0.007 (4.507)	0.004 (3.549)	0.007 (3.703)	0.004 (11.674)	0.007 (4.135)	0.004 (10.994)
LGOVCONS	-0.079 (-0.192)	0.042 (0.147)	-0.146 (-0.363)	0.043 (0.156)	-0.151 (-0.373)	0.003 (0.011)						
LTRANSGDP							-0.313 (-1.332)	-0.258 (-1.838)			-0.401 (-1.363)	-0.045 (-0.798)
LTRANS									-0.026 (-0.063)	-0.352 (-8.835)	0.260 (0.607)	-0.326 (-6.119)
REALGR	-0.063 (-1.219)		-0.078 (-1.588)		-0.060 (-1.135)		-0.146 (-3.051)				-0.177 (-2.410)	
LREALY		-0.558 (-3.590)		-0.556 (-4.234)		-0.540 (-4.587)		-0.605 (-5.720)		-0.584 (-20.089)		-0.572 (-16.991)
REALGX					-0.023 (-0.922)							
LURBAN	-0.180 (-0.920)	0.003 (0.020)										
Adj. R2	0.182	0.573	0.192	0.608	0.182	0.686	0.873	0.953	0.816	0.995	0.848	0.995
Number of obs.	16	16	16	16	16	16	8	8	8	8	8	8
Standard Error of Regression	0.443	0.320	0.440	0.306	0.443	0.274	0.233	0.140	0.280	0.042	0.254	0.004

Note: All independent variables are averages over the current period (for which poverty index is available) and one lagged value. C is the constant term. INFL is the annual change in consumer price index. LGOVCONS is the log of general government consumption in percent of GDP. LTRANSGDP is the log of the subsidies and other current transfers in percent of GDP. LTRANS is the log of the subsidies and other current transfers in percent of expenditure. REALGR is the annual growth of GNP per capita. LREALY is the log of GNP per capita in constant 1987 dollars. REALGX is the annual change in the real effective exchange rate index. LURBAN is the log of the urban population in percent of total population. Figures in parentheses beneath coefficients are t ratios.